

Facility:	IP3	Scenario No.:	1	Op Test No.:	1
Examiners:	_____	Candidates:	_____	CRS	
	_____		_____	RO	
	_____		_____	PO	
<u>Initial Conditions:</u> 100% power EOL 31 Charging Pump OOS 32 CCW Pump OOS Small SG Tube Leak < 25 GPD					
<u>Turnover:</u> Reduce load to 800 MWe to remove 33 Condensate Pump from service within 60 minutes					
<u>Critical Tasks:</u> Manual reactor trip Initiate Condensate flow					

Event No.	Malfunction No.	Event Type*	Event Description
1		R (RO) N (BOP) N (CRS)	Reduce power
2	CFW13E	C (RO)	MFRV fails closed slowly
3	PRS6B	I (RO) I (BOP)	Pressurizer level channel fails high
4	ATS4B	C (ALL)	Feedwater Pump trip requiring rapid load decrease to 700 MWe
5	ATS4A	M (ALL)	Feedwater pump trip. Reactor trip required.
6	RPS2A	C (RO)	Auto reactor trip failure. Manual trip required
7	ATS2	C (BOP)	TDAFW trips
8	CFW1A	C (BOP)	MDAFW fails to start
9	CFW1C CFW1A	C (BOP)	MDAFW trips

(N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

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## Scenario Event Description

### NRC Scenario 1

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The crew assumes the shift and initiates a power reduction. The RO will commence RCS boration and the BOP will slowly reduce generator load.

33MFRV controller fails in automatic. The controller must be placed in manual IAW ONOP-FW-1, and 33 SG level restored to the normal control band.

Pressurizer level channel 460 (controlling channel) will fail high. The crew will respond IAW ONOP-RPC-1. The RO will operate charging pumps and pressurizer heaters manually while the BOP defeats the failed channel inputs and the CRS refers to Technical Specifications.

Subsequently, 32 MBFP will trip, requiring a plant runback to 700 MWe. Normal boration will be performed for AFD control. If Rod Insertion Limits are exceeded, the RO will commence Emergency Boration.

When the plant is stabilized, 31 MBFP will trip, requiring a reactor trip. The reactor must be tripped manually IAW ONOP-FW-1, because automatic reactor trip is not functional.

Subsequent AFW failures result in the requirement to transition to FR-H.1, and restore Secondary Heat Sink using Condensate flow or Bleed and Feed.

EOP flow path: E-0 – ES-0.1 – FR-H.1

Indian Point Unit 3  
2003 NRC Initial License Examination  
Simulator Scenario Setup  
Scenario 1

**RESET TO IC-36**

<u>31 Charging Pump OOS:</u>	OVR CVC46A 2 OVR CVC46C 2 OVR CVC46D 1 OVR CVC46F 2 OVR CVC46G 2
<u>32 CCW Pump OOS:</u>	OVR CCW3A 2 OVR CCW3C 2 OVR CCW3D 1 OVR CCW3F 2 OVR CCW3G 2
<u>AUTO reactor trip failure:</u>	MAL RPS2A ACT
<u>31 ABFP fail to auto start:</u>	MAL CFW1A ACT,1,0
<u>33 ABFP trips upon starting:</u>	MAL CFW1C ACT,0,0
<u>32 ABFP Overspeed:</u>	MAL ATS2 ACT 60,C,JPPLP4

**Materials needed for scenario:**

- POP-2.1
- Graph Book
- Tags for tagged equipment
- OA-99-29 (Operator Aid)
- Daily Reactivity Sheet

Allow crew to begin scenario brief approximately 30 minutes prior to entering simulator

Note: Simulator IC data sheet has Condensate Booster Pumps in Trip Pullout

Scenario built from IC-12

Indian Point Unit 3  
2003 NRC Initial License Examination  
Simulator Scenario Turnover Information  
Scenario 1

- The plant is at 100% power, steady state conditions exist.
- End of Life,  $C_b$  is 3 ppm.
- Burnup = 23135 MWD/MTU
- Control Bank D = 224 steps
- $T_{avg}$  = 566.9°F
- RCS Pressure = 2235 psig
- A small Steam Generator Tube Leak exists on 33 SG, less than 5 gallons per day.
- 33 Condensate Pump has high vibration.

The following equipment is out of service:

- 31 Charging Pump. Return expected in approximately 6 hours.
- 32 Component Cooling Water Pump. Return to service in approximately 8 hours.

Crew instructions:

- In accordance with POP-2.1, reduce generator load to 800 MWe at a rate of 200 MWe per hour and remove 33 Condensate Pump from service.

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Event Description:		Reduce Power							
Time	Position	Applicant's Actions or Behavior							

	CRS	Refers to POP-2.1, step 4.3.1 <ul style="list-style-type: none"> <li>o Refer to Attachment 1, Watch Routines/Operating Requirements</li> </ul>
	CRS	Refers to POP-2.1, step 4.3.2 <ul style="list-style-type: none"> <li>o Go to Attachment 3, Reactor Power Reduction Checklist, for lowering plant load</li> </ul>
	CRS	Enter starting power level and desired ending power level
	CRS	Record reason for load reduction
	CRS	Ensure a reactivity calculation for power reduction is performed. (Attachment 5 may be used as necessary)
	CRS	If reactor power is less than 100%, then N/A, initial, and date all inappropriate steps
	CRS	Obtain Shift Manager permission to reduce load and continue performance of this attachment.
	CRS	Notify Entergy system operator of load reduction

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Event Description: Reduce Power

Time	Position	Applicant's Actions or Behavior
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	CRS	Commence performance of 3PT-V053B, Power Reduction Surveillance Requirements.
	CRS	Perform a reactivity briefing for pending load change
	RO	If RCS boron concentration will be changed by 10ppm or greater, then energize all PRZR backup heaters
	BOP	Initiate generator load decrease to desired generator load at desired rate using any of the following: <ul style="list-style-type: none"> <li>o Governor (preferred)</li> <li>o Load Limit 1</li> <li>o Load Limit 2</li> </ul>
	BOP	Adjust Feedwater Regulators manual setpoint to null manual-auto deviation: <ul style="list-style-type: none"> <li>o Maintain FW Regulators nulled while continuing with this attachment</li> </ul>
	RO	Initiates boration IAW SOP-CVCS-3
<p style="text-align: center;"><b><u>NOTE</u></b></p> <p>Reactivity changes shall be closely monitored by observation of different parameters such as NIs, MWs, Tavg, Tref, Control Rods, and <math>\Delta T</math></p>		
	RO	Determine required increase in boron concentration

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Event Description: Reduce Power

Time	Position	Applicant's Actions or Behavior
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	RO	Determine the volume of boric acid required for boration by using any of the following: <ul style="list-style-type: none"> <li>o CCR Reactivity Summary Sheet</li> <li>o CCR Computer program</li> <li>o CVCS-5, Boration Nomograph Hot RCS</li> <li>o CVCS-6, Boration Nomograph Cold RCS</li> <li>o The Boration/Dilution book from Westinghouse (Operator Aid)</li> </ul>
	RO	Set YIC-110, Boric Acid Flow Integrator, for required volume of boron
	RO	Set FCV-110A, Boric Acid Flow Control Blender, controller to desired flow rate
	RO	Ensure Boric Acid Trans Pump speed switches are in slow
	RO	Ensure in-service Boric Acid Transfer Pump is in AUTO
	RO	Place RCS Makeup Mode Selector switch in BORATE
	RO	Turn RCS Makeup Control switch to START and return switch to NORM

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Event Description: Reduce Power

Time	Position	Applicant's Actions or Behavior
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	RO	Observe the following as applicable: <ul style="list-style-type: none"> <li>○ IF RX critical, THEN Tavg</li> <li>○ IF rods in AUTO, THEN control bank position</li> <li>○ IF RX subcritical, THEN count rate</li> </ul>
	RO	IF any of the following occurs, THEN immediately STOP boration: <ul style="list-style-type: none"> <li>○ Rod motion is in wrong direction or becomes blocked</li> <li>○ Subcritical count rate increases AND a deliberate approach to criticality is NOT in progress</li> <li>○ Tavg increases</li> <li>○ Axial flux target band is exceeded</li> <li>○ RCP seal injection flow becomes erratic</li> </ul>
<p style="text-align: center;"><b><u>NOTE</u></b></p> <p>WHEN boric acid integrator reaches preset value, THEN boration will automatically terminate</p>		
	RO	IF performing additional boration without flushing of lines, THEN DEPRESS Integrator Reset P.B. <ul style="list-style-type: none"> <li>○ Return to Step 4.4.8 (Turn RCS Makeup control switch to START and RETURN switch to NORM)</li> </ul>
	RO	WHEN boration operation is complete, THEN FLUSH makeup lines with a minimum of 20 gallons of blended makeup per Step 4.2
<p><b><i>Proceed to Event 2 at Lead Evaluator's discretion</i></b></p>		



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Event Description: MFRV Fails Closed Slowly

Time	Position	Applicant's Actions or Behavior
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*Booth Instructor: When directed, insert the following command:*  
**MAL CFW13E ACT,0,120,0**

	CRS	Refers to ONOP-FW-1 (May refer to RPC-1 to place control in manual)
	RO	Check MBFPs – Both Running
	RO	Verify the Following Controls: <ul style="list-style-type: none"> <li>○ MBFP Speed Control – Stable</li> <li>○ All S/G levels – Stable (33 SG level is trending down)</li> </ul>
	RO	IF automatic control has failed, THEN PERFORM the following: <ul style="list-style-type: none"> <li>○ PLACE affected control system in MANUAL</li> <li>○ CONTROL affected system to stabilize plant conditions</li> <li>○ REFER to Attachment 2, Main Feedwater Regulating Valves Program ΔP.</li> </ul>

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Event Description: MFRV Fails Closed Slowly

Time	Position	Applicant's Actions or Behavior
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	RO	<p>Check the following conditions – NORMAL FOR PRESENT POWER LEVEL:</p> <ul style="list-style-type: none"> <li>○ Both MBFPs – RUNNING</li> <li>○ Heater Drain Pumps - RUNNING</li> <li>○ Condensate Pumps – RUNNING</li> <li>○ Check MBFP operation <ul style="list-style-type: none"> <li>○ MBFP instrumentation – NORMAL <ul style="list-style-type: none"> <li>▪ PI-404, Main Steam Header Pressure</li> <li>▪ PI-408A, Feed Pump Discharge Pressure</li> <li>▪ PI-408B, Feed Pump Suction Pressure</li> </ul> </li> <li>○ MBFP Speed Control – OPERATING PROPERLY</li> </ul> </li> <li>○ Main Feedwater Regulating valves – MAINTAINING SG PROGRAM LEVEL (NO)</li> </ul>
	CRS	Got to ONOP-FW-1, Step 6, Page 12
	CREW	<p>Check Main Feedwater Regulating Valves:</p> <ul style="list-style-type: none"> <li>○ MFRVs – OPERATING PROPERLY IN AUTO (NO)</li> </ul>
	CREW	PLACE affected SG main feedwater regulating valve in MANUAL (33 SG)
	CREW	Manually control affected SG NR levels between 40% and 50%

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Event Description: MFRV Fails Closed Slowly

Time	Position	Applicant's Actions or Behavior
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	CREW	<p>IF main feedwater regulating valves are NOT functioning properly, THEN CONTROL affected SG NR level using any of the following: (Should be N/A)</p> <ul style="list-style-type: none"> <li>○ Manually adjust MBFP speed</li> <li>○ Reduce unit load</li> <li>○ Use SG low flow bypass valves</li> <li>○ Continue efforts to regain control of main feedwater regulating valve</li> <li>○ Continue unit load reduction until auxiliary feedwater is capable of maintaining level</li> </ul>
	CRS	<p>DETERMINE cause of main feedwater regulating valve malfunction</p> <ul style="list-style-type: none"> <li>○ If a main feedwater regulating valve cannot be fully closed and auxiliary feedwater is capable of maintaining level, then close its associated motor operated isolation valve</li> </ul>
	CRS	<p>IF the cause of the feedwater regulating valve malfunction is due to an instrument failure, then go to ONOP-RPC-1, Instrument Failures. (Should be N/A)</p>
	CRS	<p>Initiate repairs of affected main feedwater regulating valve</p>
	CREW	<p>Check Feedwater and steam systems integrity:</p> <ul style="list-style-type: none"> <li>○ AMSAC ALERT alarm – CLEAR</li> <li>○ Containment parameters – NORMAL</li> <li>○ Plant noise levels – NORMAL</li> </ul>

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Event Description: MFRV Fails Closed Slowly

Time	Position	Applicant's Actions or Behavior
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	CRS	Determine if MBFPs should be placed in AUTO: <ul style="list-style-type: none"><li>○ Check reactor power – greater than 25%</li><li>○ Check both MBFPs - IN AUTO</li></ul>
	CRS	Return to Plant Operating Procedure
<b><i>Proceed to Event 3 at Lead Evaluator's discretion</i></b>		

Op Test No.:	<u>1</u>	Scenario #	<u>1</u>	Event #	<u>3</u>	Page	<u>13</u>	of	<u>39</u>
Event Description:		Pressurizer Level Channel Fails High							
Time	Position	Applicant's Actions or Behavior							

*Booth Instructor: When directed, insert the following command:*

**MAL PRS6B ACT,100,180,0**

	CRS	Refers to ONOP-RPC-1, Instrument Failures.
	CREW	<p>Verify the following controls:</p> <ul style="list-style-type: none"> <li>○ Turbine load – STABLE</li> <li>○ Rod Control – STABLE</li> <li>○ PRZR pressure control – NORMAL</li> <li>○ PRZR level control – NORMAL (<b>NO</b>)</li> <li>○ MBFP Speed – NORMAL</li> <li>○ SG levels – NORMAL</li> </ul>
	CREW	<p>PERFORM the following:</p> <ul style="list-style-type: none"> <li>○ If affected instrument has caused a turbine runback, then perform the following: <ul style="list-style-type: none"> <li>○ OPEN 31 DC Distribution panel, circuit 16</li> <li>○ OPEN 32 DC Distribution panel, circuit 16</li> </ul> </li> <li>○ If SG control is affected, then place affected SG transfer switches to non-affected channel (Flight Panel)</li> <li>○ If automatic control has failed, then perform the following: <ul style="list-style-type: none"> <li>○ Place affected control system in MANUAL (<b>PRZR level control</b>)</li> <li>○ Control affected system to stabilize plant conditions (<b>Place Charging Pump Speed to MANUAL</b>)</li> </ul> </li> </ul>

Op Test No.: 1 Scenario # 1 Event # 3 Page 14 of 39

Event Description: Pressurizer Level Channel Fails High

Time	Position	Applicant's Actions or Behavior
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**NOTE**

- Positive reactivity additions using control rods require CRS or SM approval and shall be made slowly and incrementally
- Substeps of step 2 may be performed in any order
- If a bistable failure is suspected with no other indications, then entry into the appropriate attachment is permitted

	RO	Check the following instrumentation: <ul style="list-style-type: none"> <li>○ RCS loop temperatures normal</li> <li>○ Check <math>\Delta T</math> setpoints               <ul style="list-style-type: none"> <li>○ Power Range channels</li> <li>○ Overpower <math>\Delta T</math></li> <li>○ Overtemperature <math>\Delta T</math></li> </ul> </li> <li>○ RCS coolant loop flow channels</li> <li>○ PRZR instrumentation               <ul style="list-style-type: none"> <li>○ Level is NOT normal</li> </ul> </li> </ul>
	CRS	Go to attachment 6, PRZR level channel failures (pg 49)
	RO	IF actual PRZR level decreases to less than 19%, then perform the following: (Has NOT gone below 19%) <ul style="list-style-type: none"> <li>○ ENSURE Letdown has isolated</li> <li>○ PLACE PRZR heater control group in STOP PULLOUT</li> <li>○ PLACE PRZR heater backup groups in OFF</li> </ul>
<b><u>NOTE</u></b> Letdown flow shall be limited to 120 gpm		

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Event Description: Pressurizer Level Channel Fails High

Time	Position	Applicant's Actions or Behavior
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	BOP	<p>If LCV-459 or LCV-460 is closed, then perform the following: (Have NOT closed. Proceed to next action)</p> <ul style="list-style-type: none"> <li>○ ENSURE the following Letdown isolation valves are closed: <ul style="list-style-type: none"> <li>○ CH-LCV-459, Letdown Isolation Valve</li> <li>○ CH-LCV-460, Letdown Isolation Valve</li> </ul> </li> <li>○ ENSURE running charging pump speed control is in MAN</li> <li>○ REDUCE charging pump speed to maintain minimum seal injection <ul style="list-style-type: none"> <li>○ 6-12 gpm per RCP</li> </ul> </li> <li>○ Ensure the following charging valves are closed: <ul style="list-style-type: none"> <li>○ CH-HCV-142, Charging Line flow Control valve</li> <li>○ CH-AOV-204A, 32 Loop Hot Leg Alternate Charging Isolation</li> <li>○ CH-AOV-204B, 31 Loop Cold Leg Normal Charging Isolation</li> </ul> </li> </ul>
	RO	<p>If affected channel has failed high, then OPERATE PRZR heaters as necessary to maintain PRZR between 2205 psig and 2260 psig. (Action required)</p>
	RO	<p>If affected channel is used for PRZR level control, then perform the following: (Action required)</p> <ul style="list-style-type: none"> <li>○ Ensure charging pump speed controller in MANUAL</li> <li>○ CONTROL PRZR level to maintain program level</li> </ul>
	BOP	<p>Place L/460A, LEVEL DEFEAT switch, for the failed instrument to the required position: (Foxboro Rack B-6)</p> <ul style="list-style-type: none"> <li>○ LI-460, Channel 2 (White), DFT CH II</li> </ul>

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Event Description: Pressurizer Level Channel Fails High

Time	Position	Applicant's Actions or Behavior
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	RO	<p>Check CVCS system:</p> <ul style="list-style-type: none"> <li>○ If letdown is secured, then re-establish charging, seal injection, and letdown per ONOP-CVCS-1, Loss of Charging Or Letdown (NOT required)</li> <li>○ If running charging pump speed controller is in MANUAL, then transfer to AUTO per SOP-CVCS-2, Charging, Seal Water, and Letdown Control (Action required) <ul style="list-style-type: none"> <li>○ ENSURE controller bias dial is set to zero</li> <li>○ PLACE in MAN BAL</li> <li>○ ADJUST to null deviation meter</li> <li>○ PLACE in AUTO</li> <li>○ MONITOR the following to verify proper automatic operation: <ul style="list-style-type: none"> <li>▪ PRZR level on program</li> <li>▪ Seal injection between 6 and 12 gpm</li> </ul> </li> </ul> </li> </ul>
	RO	<p>RESET PRZR heaters as follows:</p> <ul style="list-style-type: none"> <li>○ PLACE modulating heater control switch to STOP, then PLACE to START</li> <li>○ Leave Modulating heater control switch in AUTO</li> <li>○ PLACE one backup heater control switch to ON</li> <li>○ PLACE two backup heater control switches to OFF, then place in AUTO</li> </ul>
	RO	<p>If affected loop was selected for the PRZR level recorder, then PLACE PRZR level recorder transfer switch to a functioning channel (Flight Panel)</p>



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Event Description: Pressurizer Level Channel Fails High

Time	Position	Applicant's Actions or Behavior
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**CAUTION**

IF THE REDUNDANT CHANNELS BISTABLE LIGHTS ARE NOT EXTINGUISHED,  
THEN A REACTOR TRIP MAY OCCUR IN STEP 11

	BOP	Check all redundant BISTABLE STATUS lights listed for the failed instrument are EXTINGUISHED: <ul style="list-style-type: none"> <li>○ PRZR HI LEVEL LC459A</li> <li>○ PRZR HI LEVEL LC461A</li> </ul>
<b>Evaluator Note:</b> Step 10 of attachment will not be performed because BISTABLE TRIP STATUS LIGHTS for redundant channels are extinguished		
	BOP	PLACE the BISTABLE TRIP SWITCHES for the failed instrument to the TRIPPED (UP) position: <ul style="list-style-type: none"> <li>○ Protection Rack A-10, Loop 2, High Level Trip</li> </ul>
	BOP	Ensure the BISTABLE STATUS LIGHTS listed for the failed instrument are illuminated: <ul style="list-style-type: none"> <li>○ PRZR HI LEVEL LC460A</li> </ul>
	CREW	ENSURE the PRESSURIZER HIGH LEVEL CHANNEL TRIP annunciator is LIT.
	RO	ENSURE automatic PRZR level control is restored
<b>Booth Instructor:</b> Prior to proceeding to the next event, inform the control room that 33 Feed Reg valve controller had a loose fitting and has been satisfactorily repaired. Automatic operation of the valve may be restored. Also, remove the FRV malfunction: <b>MAL CFW13E CLR</b>		

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Event Description: Pressurizer Level Channel Fails High

Time	Position	Applicant's Actions or Behavior
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	CRS	DIRECT I&C to troubleshoot and repair failed PRZR level instrumentation
	CRS	IAW annunciator response on Panel SAF for PRZR HIGH LEVEL, CRS may refer to ITS 3.4.9 and determine it does not apply to the listed instrument failure.  Although not directed by procedure, ITS 3.3.1 will apply to failed instrument, but placing in tripped condition fulfills the intended function.
<b><i>Proceed to Event 4 at Lead Evaluator's discretion</i></b>		

Op Test No.: 1 Scenario # 1 Event # 4 Page 19 of 39

Event Description: Feedwater Pump Trip Requiring Rapid Load Decrease to 700 MWe

Time	Position	Applicant's Actions or Behavior
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*Booth Instructor: When directed, insert the following command:*  
**MAL ATS4B ACT**

	CRS	Refers to ONOP-FW-1
	CREW	Check MBFPs – Both Running (NO)
	CREW	Reduce unit load as necessary to maintain SG levels (Refer to Attachment 1) <ul style="list-style-type: none"> <li>Att. 1 indicates load will have to be reduced to approximately 700 MWe for available Feed configuration</li> </ul>
	BOP	ADJUST running MBFP speed as necessary to: <ul style="list-style-type: none"> <li>Match steam flow and feedwater flow</li> <li>Maintain MBFP suction pressure greater than 300 psig</li> </ul>
	RO	If control rods are in MANUAL, then insert rods as necessary to prevent high PRZR pressure trip
	CREW	Verify the following controls: <ul style="list-style-type: none"> <li>MBFP Speed control – STABLE</li> <li>All SG levels – STABLE</li> </ul>

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Event Description: Feedwater Pump Trip Requiring Rapid Load Decrease to 700 MWe

Time	Position	Applicant's Actions or Behavior
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	CREW	Check the following conditions – NORMAL FOR PRESENT POWER LEVEL: <ul style="list-style-type: none"><li>Both MBFPs RUNNING (NO)</li></ul>
	CRS	If one of the operating MBFPs has tripped, then go to attachment 3, MAIN BOILER FEEDWATER PUMP MALFUNCTION, Page 17
	BOP	Check ABFPs – RUNNING <ul style="list-style-type: none"><li>Start 31 and 33 ABFPs</li></ul>
	RO	Check steam flow and feedwater flow – MATCHED
	RO	Check $\Delta I$ – WITHIN NORMAL CONTROL BAND
	RO	Borate to restore $\Delta I$ . (See boration activity in event 1) If RIL exceeded, emergency boration will be performed using MOV-350
	RO	Check condenser steam dump system <ul style="list-style-type: none"><li>All steam dump valves closed</li><li>Steam dumps reset</li></ul>
	CREW	Check plant conditions stable

Op Test No.: 1 Scenario # 1 Event # 4 Page 21 of 39

Event Description: Feedwater Pump Trip Requiring Rapid Load Decrease to 700 MWe

Time	Position	Applicant's Actions or Behavior
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	BOP	Check operating MBFP – IN AUTO AND STABLE
	CREW	Verify MBFP High Discharge Pressure Limiting Circuit 'D' Curve – RESET
	BOP	Check SG Blowdown Containment Isolation Valve Control Switches – IN CLOSED POSITION
	RO	Place tripped MBFP Turbine Trip Reset Control Switch to – TRIP
	BOP	Check ABFPs NOT REQUIRED <ul style="list-style-type: none"> <li>○ STOP ABFPs</li> <li>○ Place Motor Driven ABFP control switches in AUTO</li> <li>○ Check 31 and 33 ABFP regulating valves controller setpoint dials – SET TO 0% (FULL OPEN)</li> <li>○ Check 32 ABFP regulating valves controller setpoint dials – SET TO 100% (FULL CLOSED)</li> </ul>
	BOP	Check Condensate Booster Pumps Running (NO)
	CRS	Determine cause of MBFP trip
	CRS	Determine if SG Blowdown should be established: <ul style="list-style-type: none"> <li>○ CRS may contact Chemistry or SM to request direction.</li> </ul>

Op Test No.: <u>1</u> Scenario # <u>1</u> Event # <u>4</u> Page <u>22</u> of <u>39</u>		
Event Description: Feedwater Pump Trip Requiring Rapid Load Decrease to 700 MWe		
Time	Position	Applicant's Actions or Behavior

	CRS	Go to appropriate POP as directed by CRS or SM <ul style="list-style-type: none"> <li>○ POP-2.1 still in effect</li> </ul>
<b><i>Proceed to event 5 at Lead Evaluator's discretion</i></b>		

Op Test No.:	<u>1</u>	Scenario #	<u>1</u>	Event #	<u>5, 6, 7, 8, 9</u>	Page	<u>23</u>	of	<u>39</u>
Event Description:		Feedwater Pump Trip. Reactor Trip Required. Auto Reactor Trip Failure. Manual Trip Required. TDAFW Trips; MDAFW Fails to Start; MDAFW Trips.							
Time	Position	Applicant's Actions or Behavior							

*Booth Instructor: When directed, insert the following command:*  
**MAL ATS4A ACT**

		MAY refer to ONOP-FW-1
	CRS	Directs reactor trip based upon BOTH MBFPs tripped and NO automatic reactor trip. <ul style="list-style-type: none"> <li>Directed in ONOP-FW-1 Step 1 RNO</li> </ul>
	CRS	Opens E-0, Reactor Trip or Safety Injection
<b>Critical Task</b>	RO	Manually trip reactor <ul style="list-style-type: none"> <li>Reactor trip and Bypass breakers open</li> <li>Rod bottom lights lit</li> <li>Rod position indication less than 20 steps</li> <li>Neutron flux decreasing</li> </ul>
	RO	Verify turbine trip <ul style="list-style-type: none"> <li>All turbine stop valves closed</li> </ul>
	BOP	Verify all 480V AC Busses energized by offsite power
	RO	Determine if SI is actuated <ul style="list-style-type: none"> <li>Any SI annunciator lit</li> <li>OR</li> <li>SI pumps – ANY RUNNING</li> </ul>

Op Test No.: 1 Scenario # 1 Event # 5, 6, 7, 8, 9 Page 24 of 39Event Description: Feedwater Pump Trip. Reactor Trip Required. Auto Reactor Trip Failure.  
Manual Trip Required. TDAFW Trips; MDAFW Fails to Start; MDAFW Trips.

Time	Position	Applicant's Actions or Behavior
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	RO	Determine if SI required using posted operator aid <ul style="list-style-type: none"> <li>○ Determines SI NOT required</li> </ul>
	BOP	Start Both Motor Driven ABFPs <ul style="list-style-type: none"> <li>○ Starts 31 ABFP manually</li> <li>○ 33 ABFP will NOT start</li> </ul>
	CRS	Direct transition to ES-0.1, Reactor Trip Response
	RO	Check RCS temperature – Stable at or trending to 547°F
	RO	Check Feedwater status: <ul style="list-style-type: none"> <li>○ RCS temperature less than 554°F</li> <li>○ Main and bypass FW reg valves – CLOSED</li> </ul>
Booth Instructor: When 31 ABFP is started manually, then insert the following command: <b>MAL CFW1A ACT,0,0</b>		
	BOP	Determines 31 ABFP has tripped. NO ABFPs available
	CRS	Determine RED path on Heat Sink CSF Status Tree. Transition to FR-H.1, Loss of Secondary Heat Sink



Op Test No.: 1 Scenario # 1 Event # 5, 6, 7, 8, 9 Page 25 of 39Event Description: Feedwater Pump Trip. Reactor Trip Required. Auto Reactor Trip Failure.  
Manual Trip Required. TDAFW Trips; MDAFW Fails to Start; MDAFW Trips.

Time	Position	Applicant's Actions or Behavior
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	CREW	<p>Check if secondary heat sink is required:</p> <ul style="list-style-type: none"> <li>○ RCS pressure – Greater than any non-faulted SG pressure</li> <li>○ RCS Hot Leg temperatures – Any greater than 350°F</li> </ul>
	BOP	<p>Prepare to establish AFW flow:</p> <ul style="list-style-type: none"> <li>○ Check SG Blowdown <ul style="list-style-type: none"> <li>○ SG Blowdown Isolation Valves – CLOSED</li> <li>○ SG Sample Isolation Valves – CLOSED</li> </ul> </li> <li>○ CST level – Greater than 3.0 feet</li> <li>○ Check AFWP suction valves open <ul style="list-style-type: none"> <li>○ CT-6</li> <li>○ CT-64</li> </ul> </li> </ul>
	BOP	<p>Establish AFW flow using Motor Driven pumps</p> <ul style="list-style-type: none"> <li>○ Check ABFP 480V power supplies – ANY ENERGIZED</li> <li>○ Check motor driven ABFPs – BOTH RUNNING</li> </ul>
	BOP	May attempt to start Motor driven ABFPs

Op Test No.: 1 Scenario # 1 Event # 5, 6, 7, 8, 9 Page 26 of 39Event Description: Feedwater Pump Trip. Reactor Trip Required. Auto Reactor Trip Failure.  
Manual Trip Required. TDAFW Trips; MDAFW Fails to Start; MDAFW Trips.

Time	Position	Applicant's Actions or Behavior
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	BOP	Close motor driven ABFP Aux FW reg valves <ul style="list-style-type: none"> <li>○ 31 ABFP               <ul style="list-style-type: none"> <li>○ FCV-406A</li> <li>○ FCV-406B</li> </ul> </li> <li>○ 33 ABFP               <ul style="list-style-type: none"> <li>○ FCV-406C</li> <li>○ FCV-406D</li> </ul> </li> </ul>
	CRS	Go to attachment 2, 32 ABFP operation
	BOP	Check Turbine driven AFW pump – RUNNING
	BOP	Check the following alarms: <ul style="list-style-type: none"> <li>○ AUX FEED PUMP ROOM HI TEMP alarm on Panel SDF – Has remained clear</li> <li>○ 32ABFP OVERSPEED TRIP VALVE CLOSED alarm on Panel SKF – CLEAR (NO)</li> </ul>
	BOP/CRS	Dispatch NPO to investigate cause of alarm and to reset trip
	CRS	Return to Procedure Section, step 4 until cause of trip determined
	RO	Stop all RCPs
	BOP	Check all MSIVs closed

Op Test No.: 1 Scenario # 1 Event # 5, 6, 7, 8, 9 Page 27 of 39

Event Description: Feedwater Pump Trip. Reactor Trip Required. Auto Reactor Trip Failure.  
Manual Trip Required. TDAFW Trips; MDAFW Fails to Start; MDAFW Trips.

Time	Position	Applicant's Actions or Behavior
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	BOP	Try to establish FW flow to any SG: <ul style="list-style-type: none"> <li>○ Check Condensate pump power supplies – ANY ENERGIZED</li> </ul>
	CRS	Go to attachment 3, establishing feedwater flow from secondary plant, page 37
	BOP	Check if a low pressure water source is available: <ul style="list-style-type: none"> <li>○ Check Condensate Pumps – ANY RUNNING</li> <li>○ Check Condensate Pumps – ONLY ONE RUNNING <ul style="list-style-type: none"> <li>○ Stop all but one condensate pump</li> </ul> </li> </ul>
	BOP	Block automatic SI actuation as follows: <ul style="list-style-type: none"> <li>○ Check SI – Has NOT actuated</li> <li>○ Place SI Block Key switches to DEFEAT</li> </ul>
<p style="text-align: center;"><b><u>CAUTION</u></b></p> <p>Closely monitor SG WR levels for Bleed and Feed criteria during SG depressurization</p>		

Op Test No.: 1 Scenario # 1 Event # 5, 6, 7, 8, 9 Page 28 of 39Event Description: Feedwater Pump Trip. Reactor Trip Required. Auto Reactor Trip Failure.  
Manual Trip Required. TDAFW Trips; MDAFW Fails to Start; MDAFW Trips.

Time	Position	Applicant's Actions or Behavior
<p style="text-align: center;"><b>NOTE</b></p> <ul style="list-style-type: none"> <li>○ Feed flow should be maintained to all intact SGs until NR levels are greater than 9%</li> <li>○ SG feed flow limitations of 50,000 lbm/hr, which is equivalent to 100 gpm, apply when RCS hot leg temperature is greater than 550°F AND SG WR level is less than 12%</li> </ul>		
	BOP	DEPRESSURIZE at least one SG to less than 450 psig to establish feed flow <ul style="list-style-type: none"> <li>○ Manually dump steam using atmospheric from at least one SG at maximum rate</li> </ul>
	CRS	Dispatch NPO to MBFP discharge valve breakers <ul style="list-style-type: none"> <li>○ MCC-36A; BFD-MOV-2-31</li> <li>○ MCC-36B; BFD-MOV-2-32</li> </ul>
	BOP	Prepare to align flow path: <ul style="list-style-type: none"> <li>○ Place feedwater isolation defeat key switches to DEFEAT:               <ul style="list-style-type: none"> <li>○ 1/FW1DA, Safeguards initiation rack 1-1</li> <li>○ 1/FW1DB, Safeguards initiation rack 2-1</li> </ul> </li> </ul>
	BOP	Reset SI as follows: <ul style="list-style-type: none"> <li>○ Check SI initiated (NO)</li> </ul>

Op Test No.: 1 Scenario # 1 Event # 5, 6, 7, 8, 9 Page 29 of 39Event Description: Feedwater Pump Trip. Reactor Trip Required. Auto Reactor Trip Failure.  
Manual Trip Required. TDAFW Trips; MDAFW Fails to Start; MDAFW Trips.

Time	Position	Applicant's Actions or Behavior
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	BOP	<p>Establish initial AFW conditions</p> <ul style="list-style-type: none"> <li>○ Ensure bypass feedwater MOVs open</li> <li>○ Ensure main feedwater MOVs open</li> <li>○ Crack open bypass feedwater FRVs</li> <li>○ Place main feedwater FRVs in MANUAL and CLOSE</li> </ul>
	BOP	<p>Align feedwater header:</p> <ul style="list-style-type: none"> <li>○ Manually close MBFP recirc valves</li> <li>○ Align MBFP discharge valves <ul style="list-style-type: none"> <li>○ BFD-MOV-2-31</li> <li>○ BFD-MOV-2-32</li> </ul> </li> <li>○ When MBFP discharge valves are open, then direct NPO to open MBFP discharge valve breakers</li> </ul>
<p><i>Booth Instructor: When directed to de-energize MBFP discharge MOVs, insert the following commands:</i>  <b>LOA CFW66 T</b>  <b>LOA CFW67 T</b></p>		
	RO	Place steam and feedwater flow recorders to NARROW
CRITICAL TASK	RO	Control bypass feedwater FRVs to rapidly restore at least one SG NR level to greater than 9%
<p><b><i>Terminate scenario when Condensate flow is established if bleed and feed is not required</i></b></p>		

Op Test No.:	<u>1</u>	Scenario #	<u>1</u>	Event #	<u>5, 6, 7, 8, 9</u>	Page	<u>30</u>	of	<u>39</u>
Event Description: Feedwater Pump Trip. Reactor Trip Required. Auto Reactor Trip Failure. Manual Trip Required. TDAFW Trips; MDAFW Fails to Start; MDAFW Trips.									
Time	Position	Applicant's Actions or Behavior							

**Evaluator note: If Bleed and Feed becomes required, the following steps describe initiation.**

	CRS	Check for loss of secondary heat sink: <ul style="list-style-type: none"> <li>○ Check average of the 3 lowest WR SG levels – less than 25%</li> </ul>
	BOP	Manually actuate SI as follows: <ul style="list-style-type: none"> <li>○ Manually actuate SI</li> <li>○ Manually close all MSIVs</li> </ul>
<b>Evaluator note:</b> <b>When SI is initiated, CRS MAY direct BOP to perform actions of RO-1. This guide contains the actions of RO-1 beginning on page 32.</b>		
	RO	Check all RCPs stopped
	BOP	Verify RCS Feed Path: <ul style="list-style-type: none"> <li>○ Check HHSI pumps – ANY RUNNING</li> <li>○ Verify SI valve alignment – PROPER EMERGENCY ALIGNMENT             <ul style="list-style-type: none"> <li>○ Verify Safeguard Valve Off-Normal Position on panel SBF-1 – CLEAR</li> <li>○ Ensure BIT discharge valves 1835A, 1835B – OPEN</li> <li>○ Ensure BIT inlet valves 1852A, 1852B – OPEN</li> <li>○ Ensure High Head Stop valves 856J, 856H, 856C, 856E – OPEN</li> </ul> </li> </ul>

Op Test No.:	<u>1</u>	Scenario #	<u>1</u>	Event #	<u>5, 6, 7, 8, 9</u>	Page	<u>31</u>	of	<u>39</u>
Event Description:		Feedwater Pump Trip. Reactor Trip Required. Auto Reactor Trip Failure. Manual Trip Required. TDAFW Trips; MDAFW Fails to Start; MDAFW Trips.							
Time	Position	Applicant's Actions or Behavior							

	RO	Establish RCS Bleed Path: <ul style="list-style-type: none"><li>○ Check both PRZR PORV block valves – POWER AVAILABLE</li><li>○ Check PRZR PORV block valves – BOTH OPEN</li><li>○ Open both PRZR PORVs</li></ul>
CRITICAL TASK (If Required)	RO	Verify adequate RCS Bleed path: <ul style="list-style-type: none"><li>○ Check PRZR PORVs – BOTH OPEN</li><li>○ Check PRZR PORV block valves – BOTH OPEN</li></ul>
<b><i>Terminate scenario when bleed and feed is established and verified</i></b>		

Op Test No.: 1 Scenario # All Event # Attachment 1 Page 32 of 39

Event Description: RO-1, BOP Operator Actions During EOPs

Time	Position	Applicant's Actions or Behavior
	BOP	<p>Monitor Control Room Annunciators:</p> <ol style="list-style-type: none"> <li>Acknowledge all Supervisory Panel Alarms as time permits</li> <li>Report all unusual alarms affecting accident response to CRS</li> <li>Monitor status of the following alarms: <ul style="list-style-type: none"> <li>HIGH CONT ATMOS TEMP/RTD FAILURE – CLEAR</li> <li>480 V SAFEGUARDS UNDERVOLTAGE – CLEAR</li> </ul> </li> </ol>
<p style="text-align: center;"><b><u>Caution</u></b></p> <p><b>Starting of equipment must be coordinated with the CRS to ensure that two components are <u>not</u> started at the same time on the same power supply.</b></p>		
	BOP	<p>Verify SI Pumps – RUNNING</p> <ol style="list-style-type: none"> <li>THREE SI pumps</li> <li>TWO RHR pumps</li> </ol>
	BOP	<p>Verify Containment FCU status:</p> <ol style="list-style-type: none"> <li>Check FCUs – ALL RUNNING</li> <li>Place FCU Damper control switch in – INCIDENT MODE position</li> <li>Check FCU dampers for all FCUs – IN INCIDENT MODE POSITION <ul style="list-style-type: none"> <li>Dampers A/B – CLOSED (inlet)</li> <li>Damper C – CLOSED (bypass)</li> <li>Damper D – OPEN (outlet)</li> </ul> </li> <li>Place control switches for 1104 and 1105 to OPEN</li> <li>Check Service Water Cooling Valves – OPEN <ul style="list-style-type: none"> <li>1104</li> <li>1105</li> </ul> </li> </ol>



Op Test No.: 1 Scenario # All Event # Attachment 1 Page 33 of 39

Event Description: RO-1, BOP Operator Actions During EOPs

Time	Position	Applicant's Actions or Behavior
	BOP	<p>Verify SI Valve alignment – Proper Emergency Alignment</p> <ol style="list-style-type: none"> <li>Verify Safeguard Valve Off Normal Position alarm on panel SBF-1 – CLEAR</li> <li>Ensure BIT Discharge valves 1835A, 1835B – OPEN</li> <li>Ensure BIT Inlet valves 1852A, 1852B – OPEN</li> <li>Ensure High Head Stop valves 856J, 856H, 856C, 856E – OPEN</li> <li>If RWST purification loop in service, then secure system per SOP-SI-3</li> </ol>
	BOP	<p>Verify ABFP status:</p> <ol style="list-style-type: none"> <li>Check Motor Driven Pumps – BOTH RUNNING</li> <li>Check Turbine Driven Pump – RUNNING</li> </ol>
	BOP	<p>Verify ABFP valve alignment:</p> <ol style="list-style-type: none"> <li>If Motor Driven AFW pump(s) are running, ensure SG Aux FW Reg valve controllers – Set to 0% (full open) <ul style="list-style-type: none"> <li>FCV-406A</li> <li>FCV-406B</li> <li>FCV-406C</li> <li>FCV-406D</li> </ul> </li> <li>Check SG Blowdown Isolation Valves - CLOSED</li> </ol>
	BOP	<p>Verify CCW Pump status:</p> <ol style="list-style-type: none"> <li>Check CCW pumps – ALL RUNNING</li> <li>Check RHR HX CCW Shutoff valve – OPEN</li> </ol>

Op Test No.: 1 Scenario # All Event # Attachment 1 Page 34 of 39

Event Description: RO-1, BOP Operator Actions During EOPs

Time	Position	Applicant's Actions or Behavior
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	BOP	Verify Essential Service Water Pumps – Three Running
	BOP	Verify Containment Isolation Phase A: <ul style="list-style-type: none"> <li>a. Check Phase A – ACTUATED</li> <li>b. Check Phase A valves – CLOSED               <ul style="list-style-type: none"> <li>• Refer to Attachment 2, Phase A valve closure list</li> </ul> </li> </ul>
	BOP	Verify Containment Ventilation Isolation: <ul style="list-style-type: none"> <li>a. Check Purge Valves – CLOSED               <ul style="list-style-type: none"> <li>• FCV-1170</li> <li>• FCV-1171</li> <li>• FCV-1172</li> <li>• FCV-1173</li> </ul> </li> <li>b. Check Pressure Relief valves – CLOSED               <ul style="list-style-type: none"> <li>• PCV-1190</li> <li>• PCV-1191</li> <li>• PCV-1192</li> </ul> </li> <li>c. Check WCCPP low pressure zone alarm – NOT LIT</li> <li>d. Verify IVSW Valves – OPEN               <ul style="list-style-type: none"> <li>• IV-AOV-1410</li> <li>• IV-AOV-1413</li> <li>• IV-SOV-6200</li> <li>• IV-SOV-6201</li> </ul> </li> </ul>

Op Test No.: 1 Scenario # All Event # Attachment 1 Page 35 of 39

Event Description: RO-1, BOP Operator Actions During EOPs

Time	Position	Applicant's Actions or Behavior
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	BOP	<p>Verify Emergency Diesel Generator status:</p> <ul style="list-style-type: none"> <li>a. Check EDGs – ALL RUNNING</li> <li>b. Check Both EDG SWS Outlet Flow Control Valves – OPEN <ul style="list-style-type: none"> <li>• SWN-FCV-1176</li> <li>• SWN-FCV-1176A</li> </ul> </li> <li>c. Dispatch NPO to set switches for both EDG SWS Outlet Flow Control Valves to OPEN: <ul style="list-style-type: none"> <li>• SWN-FCV-1176</li> <li>• SWN-FCV-1176A</li> </ul> </li> </ul>
	BOP	<p>Verify Control Room Ventilation:</p> <ul style="list-style-type: none"> <li>a. SET Control Room ventilation control switch to – 10% INCIDENT MODE (switch position 3)</li> <li>b. Check Damper status Dampers A, B, F1, F2 <ul style="list-style-type: none"> <li>• A – DIM</li> <li>• B – BRIGHT</li> <li>• Either F1 OR F2 – BRIGHT</li> </ul> Dampers D1 and D2 – BRIGHT </li> <li>c. Verify AC Compressors and fans – ALL RUNNING <ul style="list-style-type: none"> <li>• ACC 31A ON – BRIGHT</li> <li>• ACC 31B ON – BRIGHT</li> <li>• ACC 32A ON – BRIGHT</li> <li>• ACC 32B ON – BRIGHT</li> <li>• ACF 31 ON – BRIGHT</li> <li>• ACF 32 ON – BRIGHT</li> </ul> </li> </ul>

Op Test No.: 1 Scenario # All Event # Attachment 1 Page 36 of 39

Event Description: RO-1, BOP Operator Actions During EOPs

Time	Position	Applicant's Actions or Behavior
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	BOP	<p>Verify Emergency DC Oil Pumps status:</p> <ul style="list-style-type: none"> <li>• Main turbine emergency bearing oil pump – RUNNING</li> <li>• Dispatch NPO to verify main generator air side seal oil backup pump – RUNNING</li> <li>• MBFP DC emergency oil pump – RUNNING</li> </ul>
	BOP	<p>Reset SI as follows:</p> <ol style="list-style-type: none"> <li>Press BOTH SI RESET pushbuttons on Panel SBF-2: <ul style="list-style-type: none"> <li>• Train 1 SI Reset</li> <li>• Train 2 SI Reset</li> </ul> </li> <li>Check SI – RESET <ul style="list-style-type: none"> <li>• SI ACTUATED light – EXTINGUISHED</li> </ul> </li> </ol>
	BOP	<p>Reset MCCs as follows:</p> <ol style="list-style-type: none"> <li>Dispatch NPO to secure VC sump pumps and RCDT pumps on Waste Disposal panel</li> <li>Dispatch NPO to align and reset MCCs per SOP-EL-15</li> </ol>

**Note to examiner:**

The following step is designed to stop actions of RO-1 IF the CRS has transitioned to ES-1.1. The BOP will continue in RO-1 if there is transition to other procedures, but any time ES-1.1 is entered, the BOP will inform the CRS of automatic action verification and RO-1 will be suspended.

Op Test No.: 1 Scenario # All Event # Attachment 1 Page 37 of 39

Event Description: RO-1, BOP Operator Actions During EOPs

Time	Position	Applicant's Actions or Behavior
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	BOP	<p>Check if additional SI actions should be performed:</p> <ol style="list-style-type: none"> <li>Check if the CRS has transitioned to – ES-1.1</li> <li>Perform the following: <ul style="list-style-type: none"> <li>Inform the CRS of the status of automatic action verification</li> <li>If E-0 has been exited, THEN continue with step 17</li> <li>If E-0 has NOT been exited, then wait until E-0 is exited. When E-0 is exited, then recheck this step</li> </ul> </li> </ol>
	BOP	<p>Perform the following:</p> <ol style="list-style-type: none"> <li>Dispatch NPO to perform the following: <ul style="list-style-type: none"> <li>Close SWN-FCV-1111 and SWN-FCV-1112</li> </ul> </li> <li>Check Condensate Pumps – ONLY ONE RUNNING.</li> <li>SECURE all but one Condensate Pump</li> <li>Initiate the following section of SOP-EL-15 <ul style="list-style-type: none"> <li>Alignment of City water Cooling</li> </ul> </li> </ol>
	BOP	<p>Reset Containment isolation Phase A and Phase B as follows:</p> <ol style="list-style-type: none"> <li>PLACE switches for letdown orifice isolation valves to CLOSE: <ul style="list-style-type: none"> <li>200A</li> <li>200B</li> <li>200C</li> </ul> </li> <li>RESET Phase A</li> <li>RESET Phase B, if actuated</li> </ol>

Op Test No.: 1 Scenario # All Event # Attachment 1 Page 38 of 39

Event Description: RO-1, BOP Operator Actions During EOPs

Time	Position	Applicant's Actions or Behavior
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	BOP	<p>Establish Instrument Air and Nitrogen to containment:</p> <ul style="list-style-type: none"><li>a. Establish IA to containment:<ul style="list-style-type: none"><li>• Check INST AIR LOW PRESS alarm on panel SJF – CLEAR</li><li>• DEPRESS Inst Air reset pushbutton 28</li><li>• CHECK IA-PCV-1228, Inst Air to Cont. – OPEN</li></ul></li><li>b. ESTABLISH PRZR PORV N2 supply:<ul style="list-style-type: none"><li>• PRESS Accumulator N2 Supply Reset pushbutton 44</li><li>• Check 863, Accumulator N2 Supply Valve – OPEN</li></ul></li></ul>
	BOP	<p>Check if one non-essential Service Water pump should be started:</p> <ul style="list-style-type: none"><li>a. Check Off-Site power to at least one Non-Essential service Water Pump – AVAILABLE</li><li>b. Check SWN-FCV-1111 and SWN-FCV-1112 – CLOSED</li><li>c. START one Non-Essential Service Water pump</li></ul>
	BOP	<p>Check status of off-site power:</p> <ul style="list-style-type: none"><li>a. VERIFY all AC Busses:<ul style="list-style-type: none"><li>• Energized by off-site power</li><li>AND</li><li>• All 480V tie breakers open</li></ul></li></ul>

Op Test No.: 1 Scenario # All Event # Attachment 1 Page 39 of 39

Event Description: RO-1, BOP Operator Actions During EOPs

Time	Position	Applicant's Actions or Behavior
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**NOTE**

It is permissible for operators to perform board clean-up actions (steps 22-29 of RO1, BOP OPERATOR ACTIONS DURING USE OF EOPs) while performing actions of other EOPs; provided this does not interfere with other EOPs in progress.

**EVALUATOR NOTE:** The remainder of the steps in this attachment are highlighted (High Level) action only.

	BOP	Re-align secondary plant
	BOP	Check secondary valve position
	BOP	Check Heater Drain Pumps 31 and 32 Tripped
	BOP	Check plant equipment status
	BOP	Determine if Source Range detectors should be energized
	BOP	Start AC Oil Pumps and Stop DC Oil pumps as follows
	BOP	Check Long Term Plant status
	BOP	Inform CRS that RO-1 is complete and advise on the status of actions

Facility:	IP3	Scenario No.:	2	Op Test No.:	1
Examiners:	_____	Candidates:	_____	CRS	
	_____		_____	RO	
	_____		_____	PO	
<p><b>Initial Conditions:</b> 53% power BOL</p> <p>31 Charging Pump OOS</p> <p>32 CCW Pump OOS</p> <p>Small SG Tube Leak &lt; 25 GPD</p> <p><b>Turnover:</b> I&amp;C repair is complete on 32 MBFP Speed Controller. Raise power to 100% at 100 MWe per hour</p> <p><b>Critical Tasks:</b> Manual SI initiation</p> <p>Isolate AFW flow to faulted SG</p>					
Event No.	Malfunction No.	Event Type*	Event Description		
1		R (RO) N (BOP) N (CRS)	Raise power		
2	PRS2A	C (RO/CRS)	Spray valve fails open slowly		
3	CVC17	C (BOP/CRS)	Letdown Pressure controller failure		
4	SWS6D SWS6E SWS6F	C (ALL)	Loss of Service Water		
5	MSS2A	M (ALL)	Faulted SG		
6	SIS1A SIS1B	C (BOP)	SI fails to actuate		

\* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor



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## Scenario Event Description

### NRC Scenario 2

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The crew will assume the shift and a power increase will be commenced. The RO will initiate a dilution IAW SOP-CVCS-3 and the BOP will raise load IAW POP-2.1.

Spray valve PCV-455A will fail open, requiring the RO to take manual control to close it IAW ONOP-RCS-2.

When the spray valve is closed in manual, PCV-135, Letdown Pressure Control Valve, will fail closed. The BOP will be required to manually reopen the valve, reestablish Letdown, and control Letdown pressure IAW ARP-9 or ONOP-CVCS-1.

A loss of Service Water occurs due to a header rupture. The crew will respond using ONOP-RW-1. The plant will degrade over a period of about 5 - 10 minutes. The reactor subsequently trips due to loss of Circulating Water pumps or manual trip by the crew.

A Steam Line Break occurs on 31 SG upon reactor trip. SI fails to actuate and must be manually actuated.

EOP flow path: E-0 – E-2 – E-1 – ES-1.1

Indian Point Unit 3  
2003 NRC Initial License Examination  
Simulator Scenario Setup  
Scenario 2

**RESET TO IC-37**

**31 Charging Pump OOS:**

OVR CVC46A 2  
OVR CVC46C 2  
OVR CVC46D 1  
OVR CVC46F 2  
OVR CVC46G 2

**32 CCW Pump OOS:**

OVR CCW3A 2  
OVR CCW3C 2  
OVR CCW3D 1  
OVR CCW3F 2  
OVR CCW3G 2

**SI fails to actuate:**

MAL SIS1A ACT  
MAL SIS1B ACT

**Faulted 31 SG on Rx Trip:**

MAL MSS2A ACT, 1.5E6, 30, 0, C, JPPLP4

**Materials needed for scenario:**

- POP-2.1
- Tags for tagged equipment
- Graph Book
- OA-99-29 (Operator Aid)
- Daily Reactivity Sheet

Allow crew to begin scenario brief approximately 30 minutes prior to entering simulator

Note: Simulator IC data sheet has Condensate Booster Pumps in Trip Pullout

Scenario built from IC 19

Indian Point Unit 3  
2003 NRC Initial License Examination  
Simulator Scenario Turnover Information  
Scenario 2

- The plant is at 53% power, steady state conditions exist.
- Beginning of Life,  $C_b$  is 1521 ppm.
- Burnup = 150 MWD/MTU
- Control Bank D = 171 steps
- $T_{avg} = 556.9^{\circ}\text{F}$
- RCS Pressure = 2235 psig
- Pressurizer Level on program (34%)

The following equipment is out of service:

- 31 Charging Pump. Return expected in approximately 6 hours.
- 32 Component Cooling Water Pump. Return to service in approximately 8 hours.

Crew instructions:

- I&C repairs are complete on 32 MBFP Speed Controller.
- In accordance with POP-2.1, raise power to 100% at 100 MWe per hour.
- 32 MBFP was left in current state after retest. SOP-FW-1, section 4.13.4 will be used to place the MBFP in service at 60% power.

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Event Description: Raise Power

Time	Position	Applicant's Actions or Behavior
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	CRS	Refer to POP-2.1, Section 4.2
	CRS	Maintain applicable requirements of Attachment 1, Watch Routines/Operating Requirements at all times
	CRS	When desired to raise plant load, then go to Attachment 2
<p style="text-align: center;"><b>CAUTION</b></p> <p>Running with only one Heater Drain Pump in service and the 10" dumps open requires OM approval due to the large potential for unrecoverable transients</p>		
<p style="text-align: center;"><b>NOTE</b></p> <ul style="list-style-type: none"> <li>○ Attachment 2 shall be used for any significant (&gt;5% RTP) power increase</li> <li>○ When reactor power is increased to greater than 20% prior to the fuel being conditioned, then power increases shall be restricted to less than or equal to 3% per hour unless otherwise authorized by the Operations Manager/Designee and the Reactor Engineer</li> <li>○ Following fuel conditioning, when reactor power is increased to greater than 20%, then the rate of power increase shall be determined by the Operations Manager and is limited to a maximum of approximately 200 MW per hour</li> <li>○ The maximum plant load with only one Heater Drain pump is based on keeping the 10" dumps closed and using the 4" dumps to control Heater Drain Tank level. Having only two Condensate pumps and NO CPF Booster pumps in service will allow plant load to be maximized without opening the 10" dumps.</li> </ul>		
	CRS	Enter starting power level and desired ending power level

Op Test No.:	<u>1</u>	Scenario #	<u>2</u>	Event #	<u>1</u>	Page	<u>6</u>	of	<u>38</u>
Event Description:		Raise Power							
Time	Position	Applicant's Actions or Behavior							

**NOTE**

When greater than 45% reactor power, then any of steps 7.0 through 14.0 that are inappropriate may be N/A

	CRS	If reactor power is greater than 45%, N/A, Initial, and date in appropriate steps
	CRS	Obtain Shift Manager permission to increase reactor power and continue performance of this attachment
	CRS	Notify Entergy system operator of load increase
	CRS	Commence/continue performance of 3PT-V053A, Power Ascension Surveillance Requirements
	CRS	Prior to exceeding 50% power, position control rods for power ascension per graph RV-12 OR as recommended by the Reactor Engineer

Op Test No.: 1 Scenario # 2 Event # 1 Page 7 of 38

Event Description: Raise Power

Time	Position	Applicant's Actions or Behavior
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	CREW	<p>Initiate Reactor power increase to 100%</p> <ul style="list-style-type: none"> <li>○ Adjust FW regulators manual setpoint to null manual-auto deviation <ul style="list-style-type: none"> <li>○ Maintain FW regulators nulled while continuing with this attachment</li> </ul> </li> <li>○ Adjust control rod position per: <ul style="list-style-type: none"> <li>○ Graph RV-13, D Bank position to maintain HFP Target Flux Difference</li> <li>OR</li> <li>○ Reactor Engineer guidance</li> </ul> </li> </ul>
	RO	MAY initiate dilution IAW SOP-CVCS-3
<p style="text-align: center;"><b><u>CAUTION</u></b></p> <p>Do not dilute VCT while filling PWST. The addition of colder water bypasses the PWST heating coils and could have an adverse effect on RCP seals</p>		
	RO	<p>If desired to increase dilution rate then:</p> <ul style="list-style-type: none"> <li>○ Energize additional PRZR heaters per CRS</li> <li>○ Establish approximately 120 gpm letdown flow per SOP-CVCS-2</li> <li>○ Maintain VCT level between 30% and 50% after initiating dilution <ul style="list-style-type: none"> <li>○ Divert letdown using CH-LCV-112A as necessary</li> </ul> </li> </ul>

Op Test No.: 1 Scenario # 2 Event # 1 Page 8 of 38

Event Description: Raise Power

Time	Position	Applicant's Actions or Behavior
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**NOTE**

Reactivity changes shall be closely monitored by observation of different parameters such as NIs, MWs, Tavg, Tref, Control Rods, and  $\Delta T$

	RO	Determine required reduction in boron concentration
	RO	Determine the volume of Primary water required for dilution by using any of the following: <ul style="list-style-type: none"> <li>○ CCR Reactivity Summary Sheet</li> <li>○ CCR Computer Program</li> <li>○ CVCS-3, Dilution Nomograph for hot RCS</li> <li>○ CVCS-4, Dilution Nomograph for cold RCS</li> <li>○ The boration/dilution book from Westinghouse</li> </ul>
	RO	Set YIC-111, Primary Water flow Integrator, for desired quantity of water
	RO	Ensure 1 Pri Water Makeup Pump is running
	RO	Ensure non-running Pri Water Makeup Pump switch is in TRIP-PULLOUT

Op Test No.: 1 Scenario # 2 Event # 1 Page 9 of 38

Event Description: Raise Power

Time	Position	Applicant's Actions or Behavior
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	RO	Adjust FCV-111A, Makeup H2O to Boric Acid Blender controller for desired flow rate.  <ul style="list-style-type: none"> <li>○ If desired to increase dilution rate then set FCV-111A to approximately 75 gpm or as directed by CRS</li> </ul>
	RO	Place RCS Makeup Mode Selector switch in DILUTE
	RO	Turn RCS Makeup Control switch to START and return to NORM
	RO	Observe the following as applicable:  <ul style="list-style-type: none"> <li>○ IF RX critical, THEN Tavg</li> <li>○ IF rods in AUTO, THEN control bank position</li> <li>○ IF RX subcritical, THEN count rate</li> </ul>
	RO	IF any of the following occurs, THEN immediately STOP dilution:  <ul style="list-style-type: none"> <li>○ Rod motion is in wrong direction or becomes blocked</li> <li>○ Subcritical count rate increases by a factor of 2 or more AND a deliberate approach to criticality is NOT in progress</li> <li>○ Tavg decreases</li> <li>○ Axial flux target band is exceeded</li> <li>○ RCP seal injection flow becomes erratic</li> </ul>
	RO	Operate PRZR heaters and letdown flows as directed by CRS



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Event Description: Raise Power

Time	Position	Applicant's Actions or Behavior
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**NOTE**

- When PW Integrator reaches preset value, then dilution will automatically terminate
- When RCS boron concentration is less than 500 ppm, then flushing makeup lines with blended makeup is unnecessary

	RO	If performing additional dilution without flushing of lines, then depress PW integrator reset PB. Return to step 4.3.9 ( <b>NOT PERFORMED</b> )
	RO	If RCS boron concentration is less than 500 ppm, then go to step 4.2.17.2 ( <b>NOT APPLICABLE</b> )
	RO	When dilution operation is complete, then flush makeup lines with a minimum of 20 gallons of blended makeup per step 4.2

***Proceed to Event 3 at Lead Evaluator's discretion***

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Event Description: Spray Valve Fails Open Slowly

Time	Position	Applicant's Actions or Behavior
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*Booth Instructor: When directed, insert the following command:***MAL PRS2A ACT,100,180,0**

	CRS	Refers to ONOP-RCS-2, Malfunction of Pressurizer Pressure Control system
	RO	Check Pressurizer Pressure Channels – NORMAL <ul style="list-style-type: none"> <li>○ PI-455</li> <li>○ PI-456</li> <li>○ PI-457</li> <li>○ PI-474</li> </ul>
	RO	Check Pressurizer Pressure Master Controller functioning NORMAL <ul style="list-style-type: none"> <li>○ May take manual control</li> </ul>
<p style="text-align: center;"><b><u>CAUTION</u></b></p> <p>Auxiliary Spray shall NOT be initiated with the delta T between the pressurizer and charging flow greater than or equal to 320°F</p>		
	RO	Check PRZR Pressure DECREASING

Op Test No.: 1 Scenario # 2 Event # 2 Page 12 of 38  
 Event Description: Spray Valve Fails Open Slowly

Time	Position	Applicant's Actions or Behavior
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**NOTE**

- Per ITS 3.4.11 if the block valve is closed because of an inoperable PORV, the control power for the block valve must be removed. (within 1 hour or be in Mode 3 within 6 hours and Mode 4 within 12 hours)
- Removal of the PORV solenoid circuit fuses will de-energize the solenoid and cause the valve to fail closed
- The PORV solenoid circuit fuses are located behind the flight panel, in the lower fuse racks of sections FBR and FCR
- Per ITS 3.4.1 if PRZR pressure can NOT be restored to greater than 2205 psig in 2 hours or less than 2265 psig in one hour, then the reactor shall be placed in Mode 2 within the next 6 hours

	RO	Check PRZR PORVs CLOSED

**NOTE**

- Removal of the spray valve controller's fuse will de-energize the controller and cause the valve to fail closed
- SOP-CVCS-2 will provide additional guidance when establishing Aux Spray

	RO	Check PRZR spray and aux spray valves closed (NO)
	RO	Close the PRZR spray valve in manual
	RO	Verify PRZR heaters all energized
	RO	Verify PRZR pressure stable at or trending to 2235 psig

Op Test No.: 1 Scenario # 2 Event # 2 Page 13 of 38

Event Description: Spray Valve Fails Open Slowly

Time	Position	Applicant's Actions or Behavior
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	RO	Operate the pressurizer heaters and spray valves as required to maintain normal pressurizer pressure (Per SOP-RCS-2)
	CREW	When repairs have been completed, then restore operable components in the automatic mode
<b><i>Proceed to Event 4 at Lead Evaluator's discretion</i></b>		

Op Test No.: 1 Scenario # 2 Event # 3 Page 14 of 38

Event Description: Letdown Pressure Controller Failure

Time	Position	Applicant's Actions or Behavior
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Booth Instructor: When directed, insert the following command:

**MAL CVC17 ACT,100,10,0**

	CRS/BOP	Refer to ONOP-CVCS-1 AND/OR ARP 9 for LD Pressure High <b>(The following steps are from ONOP-CVCS-1)</b>
	RO	Check PRZR level greater than 19%
	RO	Check VCT level greater than 5%
	RO	Check VCT level greater than 9%
	RO	Check Charging flow established <ul style="list-style-type: none"> <li>Charging flow indicated on FI-128B</li> </ul>
<p style="text-align: center;"><b>CAUTION</b></p> <ul style="list-style-type: none"> <li>If the RCS is water solid, then letdown and charging flows will control RCS pressure</li> <li>If there is a leak in the Non-Regenerative Heat Exchanger, ONOP-CC-2, Leakage Into the Component Cooling Water System should be entered to address the leak and possible reactivity effects</li> </ul>		
<p style="text-align: center;"><b>NOTE</b></p> <p>Shift Manager approval is required prior to restarting a tripped Charging Pump</p>		
	RO	Check Charging Pumps – AT LEAST ONE RUNNING

Op Test No.: 1 Scenario # 2 Event # 3 Page 15 of 38

Event Description: Letdown Pressure Controller Failure

Time	Position	Applicant's Actions or Behavior
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	RO	<p>Check Charging flow established</p> <ul style="list-style-type: none"> <li>○ Charging flow indicated on FI-128B</li> </ul>
	BOP	<p>Determine letdown status:</p> <ul style="list-style-type: none"> <li>○ Check Letdown flow – APPROXIMATELY 0 gpm</li> <li>○ Check Orifice Isolation Valves – ALL CLOSED <ul style="list-style-type: none"> <li>○ Close all Letdown orifice Isolations <ul style="list-style-type: none"> <li>▪ CH-AOV-200A</li> <li>▪ CH-AOV-200B</li> <li>▪ CH-AOV-200C</li> </ul> </li> </ul> </li> <li>○ Prepare PCV-135, Low Pressure Letdown Line, for service <ul style="list-style-type: none"> <li>○ Check PCV-135 – IN MAN <ul style="list-style-type: none"> <li>▪ Place in AUTO BAL</li> <li>▪ Adjust manual setpoint to null deviation meter</li> <li>▪ Place in MAN</li> </ul> </li> <li>○ Adjust PCV-135 controller to approximately 50%</li> </ul> </li> <li>○ Prepare TCV-130, Non-regenerative heat exchanger CCW outlet temperature control valve, for service: <ul style="list-style-type: none"> <li>○ Check TCV-130 in MAN <ul style="list-style-type: none"> <li>▪ Place in AUTO BAL</li> <li>▪ Adjust manual setpoint to null deviation meter</li> <li>▪ Place in MAN</li> </ul> </li> <li>○ Slowly adjust TCV-130 controller to approximately 50%</li> </ul> </li> </ul>

Op Test No.:	<u>1</u>	Scenario #	<u>2</u>	Event #	<u>3</u>	Page	<u>16</u>	of	<u>38</u>
Event Description:		Letdown Pressure Controller Failure							
Time	Position	Applicant's Actions or Behavior							

	BOP	Check the following valves OPEN: <ul style="list-style-type: none"> <li>○ CH-AOV-201</li> <li>○ CH-AOV-202</li> <li>○ CH-LCV-459</li> <li>○ CH-LCV-460</li> </ul>
	BOP	Check the following valves – IN AUTO <ul style="list-style-type: none"> <li>○ CH-TCV-149, Demineralizer Diversion Valve</li> <li>○ CH-LCV-112A, VCT Inlet Diversion Valve</li> </ul>
	BOP	Open CH-AOV-200B and immediately go to next step
	BOP	Check Letdown flow established <ul style="list-style-type: none"> <li>○ Letdown flow indicated on FI-134</li> </ul>
	CREW	Control Charging and Letdown: <ul style="list-style-type: none"> <li>○ Adjust PCV-135, low pressure letdown line, to maintain the following conditions:             <ul style="list-style-type: none"> <li>○ PI-135 LP Letdown Pressure between 225 and 275 psig</li> <li>○ Total charging and letdown flow rates balanced</li> </ul> </li> <li>○ Adjust TCV-130 to maintain letdown temperature between 100 and 130°F             <ul style="list-style-type: none"> <li>○ TI 130, LP Letdown Temp</li> </ul> </li> <li>○ Maintain RCP seal injection between 6 – 12 gpm</li> <li>○ Check charging and letdown flows balanced</li> </ul>

Op Test No.: 1 Scenario # 2 Event # 3 Page 17 of 38

Event Description: Letdown Pressure Controller Failure

Time	Position	Applicant's Actions or Behavior
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**Evaluator note: the following steps for Letdown restoration are from ARP-9 based upon high Letdown Pressure**

	BOP	Verify alarm by observing LP Letdown pressure indicator
	BOP	Adjust CH-PCV-135, Letdown Backpressure controller, to reduce letdown pressure
	BOP	If CH-PCV-135 does NOT respond in AUTO, then perform the following: <ul style="list-style-type: none"><li>○ Place CH-PCV-135 in MANUAL and control pressure</li></ul>
<b><i>Proceed to Event 5 at Lead Evaluator's discretion</i></b>		



Op Test No.:	<u>1</u>	Scenario #	<u>2</u>	Event #	<u>4,5,6</u>	Page	<u>18</u>	of	<u>38</u>
Event Description: Loss of Service Water; Faulted SG; SI Fails to Actuate									
Time	Position	Applicant's Actions or Behavior							

*Booth Instructor: When directed, insert the following commands:*

**MAL SWS9B ACT,100,300,0**

**MAL SWS6D ACT,12,400,0**

	CREW	Refer to ARP-12 for Low SW header pressure
	BOP	Verify alarm by observing indicated service water header pressure
	BOP	If low pressure condition exists, then: <ul style="list-style-type: none"> <li>Start 1 additional pump per SOP-RW-5, Service Water System operation</li> <li>Starts pump 37 or 39 to maintain SW pressure 60 -97.5 psig</li> </ul>
	CRS	Investigate cause of alarm
	CRS	If necessary, Go to ONOP-RW-1, Service Water Malfunction
<b>Evaluator Note: SW header pressure will continue to degrade. Reactor trip will occur either when the Circ pumps are lost or the crew determines that a manual reactor trip is required.</b>		
	BOP	Verify Service Water Header pressure is adequate for plant loads – greater than 60 psig (NO) <ul style="list-style-type: none"> <li>Start backup Service Water pumps to restore pressure</li> </ul>

Op Test No.:	<u>1</u>	Scenario #	<u>2</u>	Event #	<u>4,5,6</u>	Page	<u>19</u>	of	<u>38</u>
Event Description: Loss of Service Water; Faulted SG; SI Fails to Actuate									
Time	Position	Applicant's Actions or Behavior							

	BOP	Check Intake Structure SW Pumps – ANY AVAILABLE
	BOP	Determine if unit can remain on-line <ul style="list-style-type: none"> <li>○ Verify Service Water Header Pressure can be maintained above 50 psig (NO)</li> </ul>
	CREW	Trip the reactor (If not already tripped) and enter E-0.
	CRS	Go to E-0, Reactor Trip or Safety Injection
	RO	Verify reactor trip: <ul style="list-style-type: none"> <li>○ Reactor trip and bypass breakers open</li> <li>○ Rod bottom lights lit</li> <li>○ Rod position indicators less than 20 steps</li> <li>○ Neutron flux decreasing</li> </ul>
	RO	Verify Turbine Trip: <ul style="list-style-type: none"> <li>○ Verify all turbine stop valves closed</li> </ul>
	BOP	Verify 480V AC Busses – All energized by offsite power

Op Test No.: 1 Scenario # 2 Event # 4,5,6 Page 20 of 38

Event Description: Loss of Service Water; Faulted SG; SI Fails to Actuate

Time	Position	Applicant's Actions or Behavior
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	Crew	Determine if SI is actuated <ul style="list-style-type: none"> <li>Any SI annunciator lit</li> </ul> OR <ul style="list-style-type: none"> <li>SI pumps – ANY RUNNING</li> </ul>
CRITICAL TASK	RO	Determine if SI is required using posted operator aid <ul style="list-style-type: none"> <li>SI is required</li> <li><b>MANUALLY initiate SI</b></li> <li>Manually close MSIVs</li> </ul>
	BOP	Check AFW status: <ul style="list-style-type: none"> <li>Verify total AFW flow – greater than 365 gpm</li> <li>Control feed flow to maintain SG NR levels between 9%(14%) and 50%</li> </ul>
<p style="text-align: center;"><b><u>CAUTION</u></b></p> <p>Starting of equipment must be coordinated with all control room operators to ensure that two components are NOT started at the same time on the same power supply</p>		
	CRS	Direct BOP operator to perform RO-1, BOP operator actions during use of EOPs (steps begin on page 31 of this guide)

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Event Description: Loss of Service Water; Faulted SG; SI Fails to Actuate

Time	Position	Applicant's Actions or Behavior
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	RO	Verify Feedwater Isolation: <ul style="list-style-type: none"> <li>○ Verify MBFPs tripped</li> <li>○ Verify MBFP discharge valves closed               <ul style="list-style-type: none"> <li>○ BFD-MOV-2-31</li> <li>○ BFD-MOV-2-32</li> </ul> </li> <li>○ Verify Main and Bypass feedwater isolated               <ul style="list-style-type: none"> <li>○ Main and Bypass FW MOVs closed</li> <li>OR</li> <li>○ Main (SNF panel) and Bypass FW FRVs closed</li> </ul> </li> </ul>
	RO	Check SG Blowdown: <ul style="list-style-type: none"> <li>○ SG Blowdown isolation valves closed</li> <li>○ SG Sample isolation valves closed</li> </ul>
	RO	Verify SI flow: <ul style="list-style-type: none"> <li>○ Check RCS pressure less than 1650 psig (2000 psig)</li> <li>○ Check HHSI pump flow indicators – Flow indicated</li> <li>○ Check RCS pressure less than 325 psig (650 psig) (NO)</li> </ul>
	RO	Verify Containment Spray NOT required: <ul style="list-style-type: none"> <li>○ Check containment pressure has remained less than 22 psig</li> </ul>

Op Test No.:	<u>1</u>	Scenario #	<u>2</u>	Event #	<u>4,5,6</u>	Page	<u>22</u>	of	<u>38</u>
Event Description: Loss of Service Water; Faulted SG; SI Fails to Actuate									
Time	Position	Applicant's Actions or Behavior							

	RO	Check RCP seal cooling: <ul style="list-style-type: none"> <li>Verify CCW flow to RCP thermal barriers               <ul style="list-style-type: none"> <li>RCP BEARING COOLANT LOW FLOW alarm on panel SGF clear</li> <li>THERMAL BARRIER CCW HEADER LOW FLOW alarm on panel SGF clear</li> </ul> </li> </ul>
	RO	Check RCS average temperature stable at or trending to 547°F
	RO	Stop dumping steam: <ul style="list-style-type: none"> <li>Control total feed flow</li> <li>Maintain greater than 365 gpm flow until at least one SG NR level greater than 9% (14%)</li> <li>Close all MSIVs (Should already be closed)</li> </ul>
	RO	Check if RCPs should be stopped <ul style="list-style-type: none"> <li>HHSI pumps – AT LEAST 1 RUNNING</li> <li>RCS Subcooling – LESS THAN REQUIRED (NO)</li> </ul>
	RO	Check PRZR PORVs, Safety Valves, and Spray Valves <ul style="list-style-type: none"> <li>Check both PRZR PORVs – CLOSED</li> <li>Check PRZR Safety Valves – CLOSED               <ul style="list-style-type: none"> <li>Tailpipe temperatures normal</li> <li>Acoustic monitors normal</li> </ul> </li> <li>Check normal PRZR Spray Valves closed</li> <li>Check CH-AOV-212 closed</li> </ul>

Op Test No.:	<u>1</u>	Scenario #	<u>2</u>	Event #	<u>4,5,6</u>	Page	<u>23</u>	of	<u>38</u>
Event Description:		Loss of Service Water; Faulted SG; SI Fails to Actuate							
Time	Position	Applicant's Actions or Behavior							

	RO	Determine if SGs are faulted: <ul style="list-style-type: none"> <li>Check SG pressures:               <ul style="list-style-type: none"> <li>ANY DECREASING IN AN UNCONTROLLED MANNER (YES)</li> </ul> </li> </ul>
	CRS	Go to E-2, Faulted SG Isolation
<p style="text-align: center;"><b>CAUTION</b></p> <ul style="list-style-type: none"> <li>At least one SG must be maintained available for RCS cooldown</li> <li>Any faulted SG or secondary break should remain isolated during subsequent recovery actions unless needed for RCS cooldown</li> </ul>		
	RO	Check Main Steamline isolation and bypass valves closed
	RO	Determine if any SG is intact: <ul style="list-style-type: none"> <li>Check SG pressures – ANY STABLE OR INCREASING (YES)</li> </ul>
	RO	Identify Faulted SG <ul style="list-style-type: none"> <li>Check SG pressures – ANY DECREASING IN UNCONTROLLED MANNER</li> <li>ANY DEPRESSURIZED (YES, 31 SG is faulted)</li> </ul>

Op Test No.: 1 Scenario # 2 Event # 4,5,6 Page 24 of 38

Event Description: Loss of Service Water; Faulted SG; SI Fails to Actuate

Time	Position	Applicant's Actions or Behavior
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**CAUTION**

If the turbine driven AFW pump is the only available source of feed flow, then the steam supply to the turbine driven AFW pump must be maintained from one SG

CRITICAL TASK	Crew	<p>Isolate Faulted SG:</p> <ul style="list-style-type: none"><li>○ Check 32 and 33 SGs – BOTH INTACT</li><li>○ Isolate 31 SG lines:<ul style="list-style-type: none"><li>○ MFW FRVs or MOVs</li><li>○ Bypass FW FRVs or MOVs</li><li>○ AFW flow</li><li>○ Verify SG Atmospheric closed</li><li>○ Close SG BD isolation valves</li><li>○ Close SG sample valves</li><li>○ Isolate MSIV upstream traps using posted operator aid</li></ul></li></ul>
	Crew	<p>Check secondary radiation:</p> <ul style="list-style-type: none"><li>○ Check seismic event not occurred</li><li>○ Direct Watch Chemist to sample all SGs for activity</li><li>○ Direct Watch HP to perform contact radiation surveys on all SG steamlines and blowdown lines</li><li>○ Reset SG sample valves:<ul style="list-style-type: none"><li>○ Place BD valve control switches to close</li><li>○ Ensure 200A,B,C closed</li><li>○ Reset Phase A</li><li>○ Press SG BD and sample valves reset PBs 17 through 24 on Panel SMF</li></ul></li><li>○ Check secondary radiation recorder trends indicate normal<ul style="list-style-type: none"><li>○ R-15, Steam Air Ejector</li><li>○ R-19, Blowdown Tank area</li><li>○ R62A-D, Main steam lines</li></ul></li><li>○ Check SG levels stable</li></ul>

Op Test No.:	<u>1</u>	Scenario #	<u>2</u>	Event #	<u>4,5,6</u>	Page	<u>25</u>	of	<u>38</u>
Event Description: Loss of Service Water; Faulted SG; SI Fails to Actuate									
Time	Position	Applicant's Actions or Behavior							

	CRS	Go to E-1, Loss of Reactor or Secondary Coolant
	RO	Check if RCPs should be stopped <ul style="list-style-type: none"> <li>○ HHSI pumps – AT LEAST 1 RUNNING</li> <li>○ RCS Subcooling – LESS THAN REQUIRED (NO)</li> </ul>
	RO	Determine if SGs are faulted: <ul style="list-style-type: none"> <li>○ Check SG pressures:               <ul style="list-style-type: none"> <li>○ ANY DECREASING IN AN UNCONTROLLED MANNER (YES)</li> </ul> </li> <li>○ ANY COMPLETELY DEPRESSURIZED</li> </ul>
	Crew	Check all faulted SGs isolated, unless needed for RCS cooldown: <ul style="list-style-type: none"> <li>○ Check 31 steam lines - isolated:               <ul style="list-style-type: none"> <li>○ MSIVs</li> <li>○ MSIV bypasses</li> <li>○ MFW FRVs or MOVs</li> <li>○ Bypass FW FRVs or MOVs</li> <li>○ AFW flow</li> <li>○ Verify SG Atmospherics closed</li> <li>○ Close SG BD isolation valves</li> <li>○ Close SG sample valves</li> <li>○ SG traps</li> </ul> </li> </ul>
	Crew	Check affected SG to TDAFW isolated (N/A)



Op Test No.:	<u>1</u>	Scenario #	<u>2</u>	Event #	<u>4,5,6</u>	Page	<u>26</u>	of	<u>38</u>
Event Description: Loss of Service Water; Faulted SG; SI Fails to Actuate									
Time	Position	Applicant's Actions or Behavior							

	RO	Check Intact SG levels <ul style="list-style-type: none"> <li>○ Check level response in all intact SGs – NORMAL</li> <li>○ Control feed flow to maintain intact SG NR level between 9% (14%) and 50%</li> </ul>
	RO/BOP	Reset SI as follows: <ul style="list-style-type: none"> <li>a. Check verification of SI automatic actions of steps 2 – 12 of RO-1 is complete</li> <li>b. Press BOTH SI RESET pushbuttons on Panel SBF-2:               <ul style="list-style-type: none"> <li>• Train 1 SI Reset</li> <li>• Train 2 SI Reset</li> </ul> </li> <li>c. Check SI – RESET               <ul style="list-style-type: none"> <li>• SI ACTUATED light – EXTINGUISHED</li> </ul> </li> </ul>
	RO/BOP	Reset Containment Isolation Phase A and Phase B as follows: <ul style="list-style-type: none"> <li>○ Place switches for letdown orifice isolation valves to close:               <ul style="list-style-type: none"> <li>○ 200A</li> <li>○ 200B</li> <li>○ 200C</li> </ul> </li> <li>○ Reset Phase A</li> <li>○ Reset Phase B, if required (NO)</li> </ul>

Op Test No.:	<u>1</u>	Scenario #	<u>2</u>	Event #	<u>4,5,6</u>	Page	<u>27</u> of <u>38</u>
Event Description: Loss of Service Water; Faulted SG; SI Fails to Actuate							
Time	Position	Applicant's Actions or Behavior					

	RO/BOP	<p>Check secondary radiation:</p> <ul style="list-style-type: none"> <li>○ Check seismic event not occurred</li> <li>○ Direct Watch Chemist to sample all SGs for activity</li> <li>○ Direct Watch HP to perform contact radiation surveys on all SG steamlines and blowdown lines</li> <li>○ Reset SG sample valves: <ul style="list-style-type: none"> <li>○ Place BD valve control switches to close</li> <li>○ Ensure 200A,B,C closed</li> <li>○ Reset Phase A</li> <li>○ Press SG BD and sample valves reset PBs 17 through 24 on Panel SMF</li> </ul> </li> <li>○ Check secondary radiation recorder trends indicate normal <ul style="list-style-type: none"> <li>○ R-15, Steam Air Ejector</li> <li>○ R-19, Blowdown Tank area</li> <li>○ R62A-D, Main steam lines</li> </ul> </li> <li>○ Check SG levels stable</li> </ul>
	RO	<p>Check PRZR PORVs and Block Valves:</p> <ul style="list-style-type: none"> <li>○ Check power to block valves available</li> <li>○ Check PORVs closed</li> <li>○ Check block valves – ANY OPEN</li> </ul>
	BOP	<p>Establish Instrument Air to containment:</p> <ul style="list-style-type: none"> <li>○ Check INST AIR LOW PRESS alarm on panel SJF clear</li> <li>○ Press Instr. Air Reset PB 28 on panel SMF</li> <li>○ Open IA-PCV-1228, Inst Air to Cont.</li> </ul>

Op Test No.:	<u>1</u>	Scenario #	<u>2</u>	Event #	<u>4,5,6</u>	Page	<u>28</u>	of	<u>38</u>
Event Description: Loss of Service Water; Faulted SG; SI Fails to Actuate									
Time	Position	Applicant's Actions or Behavior							

	RO	Check RCP Seal Cooling: <ul style="list-style-type: none"> <li>Seal injection established</li> <li>OR</li> <li>Thermal Barrier cooling established</li> </ul>
	BOP	Check Component Cooling Water for Charging Pump Cooling available
	RO	Determine if Charging flow has been established: <ul style="list-style-type: none"> <li>Check Charging Pump suction valves – Both energized and one valve open               <ul style="list-style-type: none"> <li>CH-LCV-112B</li> <li>CH-LCV-112C</li> </ul> </li> <li>Check CH-AOV-204B, Normal Charging isolation-OPEN</li> <li>Check HCV-142 fully open</li> <li>Check Charging pumps – ANT RUNNING</li> </ul>
	Crew	Determine if SI should be terminated: <ul style="list-style-type: none"> <li>Check RCS subcooling based on qualified CETs greater than 40°F (OR table)</li> <li>Check secondary heat sink               <ul style="list-style-type: none"> <li>Total AFW to intact SGs greater than 365 psig available, OR</li> <li>Intact SG NR levels – ANY greater than 9% (14%)</li> </ul> </li> <li>RCS pressure               <ul style="list-style-type: none"> <li>Greater than 1650 psig (2000 psig)</li> <li>Stable or increasing</li> </ul> </li> <li>Pressurizer level greater than 14%</li> </ul>

Op Test No.:	<u>1</u>	Scenario #	<u>2</u>	Event #	<u>4,5,6</u>	Page	<u>29</u>	of	<u>38</u>
Event Description: Loss of Service Water; Faulted SG; SI Fails to Actuate									
Time	Position	Applicant's Actions or Behavior							

	CRS	Go to ES-1.1, SI Termination
	RO/BOP	Reset SI as follows: <ul style="list-style-type: none"> <li>○ Check verification of SI automatic actions of steps 2 – 12 of RO-1 is complete</li> <li>○ Press BOTH SI RESET pushbuttons on Panel SBF-2: <ul style="list-style-type: none"> <li>a. Train 1 SI Reset</li> <li>b. Train 2 SI Reset</li> </ul> </li> <li>○ Check SI – RESET <ul style="list-style-type: none"> <li>a. SI ACTUATED light – EXTINGUISHED</li> </ul> </li> </ul>
	RO/BOP	Reset Containment Isolation Phase A and Phase B as follows: <ul style="list-style-type: none"> <li>○ Place switches for letdown orifice isolation valves to close: <ul style="list-style-type: none"> <li>○ 200A</li> <li>○ 200B</li> <li>○ 200C</li> </ul> </li> <li>○ Reset Phase A</li> <li>○ Reset Phase B, if required (NO)</li> </ul>
	CRS	Direct BOP operator to initiate performance of attachment 3, Re-establishing operator control of valves following phase A reset

Op Test No.: 1 Scenario # 2 Event # 4,5,6 Page 30 of 38

Event Description: Loss of Service Water; Faulted SG; SI Fails to Actuate

Time	Position	Applicant's Actions or Behavior
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	RO	Establish Instrument Air to containment: <ul style="list-style-type: none"><li>○ Check INST AIR LOW PRESS alarm on panel SJF clear</li><li>○ Press Instr. Air Reset PB 28 on panel SMF</li><li>○ Open IA-PCV-1228, Inst Air to Cont.</li></ul>
	RO	Stop SI pumps and place in AUTO <ul style="list-style-type: none"><li>○ SI pumps</li><li>○ RHR pumps</li></ul>
<b><i>Terminate scenario when SI pumps are off</i></b>		

Op Test No.: 1 Scenario # All Event # Attachment 1 Page 31 of 38

Event Description: RO-1, BOP Operator Actions During EOPs

Time	Position	Applicant's Actions or Behavior
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	BOP	<p>Monitor Control Room Annunciators:</p> <ol style="list-style-type: none"> <li>Acknowledge all Supervisory Panel Alarms as time permits</li> <li>Report all unusual alarms affecting accident response to CRS</li> <li>Monitor status of the following alarms: <ul style="list-style-type: none"> <li>HIGH CONT ATMOS TEMP/RTD FAILURE – CLEAR</li> <li>480 V SAFEGUARDS UNDERVOLTAGE – CLEAR</li> </ul> </li> </ol>
<p style="text-align: center;"><b><u>Caution</u></b></p> <p><b>Starting of equipment must be coordinated with the CRS to ensure that two components are <u>not</u> started at the same time on the same power supply.</b></p>		
	BOP	<p>Verify SI Pumps – RUNNING</p> <ol style="list-style-type: none"> <li>THREE SI pumps</li> <li>TWO RHR pumps</li> </ol>
	BOP	<p>Verify Containment FCU status:</p> <ol style="list-style-type: none"> <li>Check FCUs – ALL RUNNING</li> <li>Place FCU Damper control switch in – INCIDENT MODE position</li> <li>Check FCU dampers for all FCUs – IN INCIDENT MODE POSITION <ul style="list-style-type: none"> <li>Dampers A/B – CLOSED (inlet)</li> <li>Damper C – CLOSED (bypass)</li> <li>Damper D – OPEN (outlet)</li> </ul> </li> <li>Place control switches for 1104 and 1105 to OPEN</li> <li>Check Service Water Cooling Valves – OPEN <ul style="list-style-type: none"> <li>1104</li> <li>1105</li> </ul> </li> </ol>
	BOP	Verify SI Valve alignment – Proper Emergency Alignment

Op Test No.: 1 Scenario # All Event # Attachment 1 Page 32 of 38

Event Description: RO-1, BOP Operator Actions During EOPs

Time	Position	Applicant's Actions or Behavior
		<ul style="list-style-type: none"> <li>a. Verify Safeguard Valve Off Normal Position alarm on panel SBF-1 – CLEAR</li> <li>b. Ensure BIT Discharge valves 1835A, 1835B – OPEN</li> <li>c. Ensure BIT Inlet valves 1852A, 1852B – OPEN</li> <li>d. Ensure High Head Stop valves 856J, 856H, 856C, 856E – OPEN</li> <li>e. If RWST purification loop in service, then secure system per SOP-SI-3</li> </ul>
	BOP	Verify ABFP status: <ul style="list-style-type: none"> <li>a. Check Motor Driven Pumps – BOTH RUNNING</li> <li>b. Check Turbine Driven Pump – RUNNING</li> </ul>
	BOP	Verify ABFP valve alignment: <ul style="list-style-type: none"> <li>a. If Motor Driven AFW pump(s) are running, ensure SG Aux FW Reg valve controllers – Set to 0% (full open)               <ul style="list-style-type: none"> <li>• FCV-406A</li> <li>• FCV-406B</li> <li>• FCV-406C</li> <li>• FCV-406D</li> </ul> </li> <li>b. Check SG Blowdown Isolation Valves - CLOSED</li> </ul>

Op Test No.: 1 Scenario # All Event # Attachment 1 Page 33 of 38

Event Description: RO-1, BOP Operator Actions During EOPs

Time	Position	Applicant's Actions or Behavior
	BOP	Verify CCW Pump status: <ul style="list-style-type: none"> <li>a. Check CCW pumps – ALL RUNNING</li> <li>b. Check RHR HX CCW Shutoff valve – OPEN</li> </ul>
	BOP	Verify Essential Service Water Pumps – Three Running
	BOP	Verify Containment Isolation Phase A: <ul style="list-style-type: none"> <li>a. Check Phase A – ACTUATED</li> <li>b. Check Phase A valves – CLOSED               <ul style="list-style-type: none"> <li>• Refer to Attachment 2, Phase A valve closure list</li> </ul> </li> </ul>
	BOP	Verify Containment Ventilation Isolation: <ul style="list-style-type: none"> <li>a. Check Purge Valves – CLOSED               <ul style="list-style-type: none"> <li>• FCV-1170</li> <li>• FCV-1171</li> <li>• FCV-1172</li> <li>• FCV-1173</li> </ul> </li> <li>b. Check Pressure Relief valves – CLOSED               <ul style="list-style-type: none"> <li>• PCV-1190</li> <li>• PCV-1191</li> <li>• PCV-1192</li> </ul> </li> <li>c. Check WCCPP low pressure zone alarm – NOT LIT</li> <li>d. Verify IVSW Valves – OPEN               <ul style="list-style-type: none"> <li>• IV-AOV-1410</li> <li>• IV-AOV-1413</li> <li>• IV-SOV-6200</li> <li>• IV-SOV-6201</li> </ul> </li> </ul>
	BOP	Verify Emergency Diesel Generator status:



Op Test No.: 1 Scenario # All Event # Attachment 1 Page 34 of 38

Event Description: RO-1, BOP Operator Actions During EOPs

Time	Position	Applicant's Actions or Behavior
		<ul style="list-style-type: none"> <li>a. Check EDGs – ALL RUNNING</li> <li>b. Check Both EDG SWS Outlet Flow Control Valves – OPEN               <ul style="list-style-type: none"> <li>• SWN-FCV-1176</li> <li>• SWN-FCV-1176A</li> </ul> </li> <li>c. Dispatch NPO to set switches for both EDG SWS Outlet Flow Control Valves to OPEN:               <ul style="list-style-type: none"> <li>• SWN-FCV-1176</li> <li>• SWN-FCV-1176A</li> </ul> </li> </ul>
	BOP	<p>Verify Control Room Ventilation:</p> <ul style="list-style-type: none"> <li>a. SET Control Room ventilation control switch to – 10% INCIDENT MODE (switch position 3)</li> <li>b. Check Damper status Dampers A, B, F1, F2               <ul style="list-style-type: none"> <li>• A – DIM</li> <li>• B – BRIGHT</li> <li>• Either F1 OR F2 – BRIGHT</li> </ul> </li> <li>c. Verify AC Compressors and fans – ALL RUNNING               <ul style="list-style-type: none"> <li>• ACC 31A ON – BRIGHT</li> <li>• ACC 31B ON – BRIGHT</li> <li>• ACC 32A ON – BRIGHT</li> <li>• ACC 32B ON – BRIGHT</li> <li>• ACF 31 ON – BRIGHT</li> <li>• ACF 32 ON – BRIGHT</li> </ul> </li> </ul>

Op Test No.:	<u>1</u>	Scenario #	<u>All</u>	Event #	<u>Attachment 1</u>	Page	<u>35</u>	of	<u>38</u>
Event Description: RO-1, BOP Operator Actions During EOPs									
Time	Position	Applicant's Actions or Behavior							

	BOP	<p>Verify Emergency DC Oil Pumps status:</p> <ul style="list-style-type: none"> <li>• Main turbine emergency bearing oil pump – RUNNING</li> <li>• Dispatch NPO to verify main generator air side seal oil backup pump – RUNNING</li> <li>• MBFP DC emergency oil pump – RUNNING</li> </ul>
	BOP	<p>Reset SI as follows:</p> <ul style="list-style-type: none"> <li>d. Press BOTH SI RESET pushbuttons on Panel SBF-2: <ul style="list-style-type: none"> <li>• Train 1 SI Reset</li> <li>• Train 2 SI Reset</li> </ul> </li> <li>e. Check SI – RESET <ul style="list-style-type: none"> <li>• SI ACTUATED light – EXTINGUISHED</li> </ul> </li> </ul>
	BOP	<p>Reset MCCs as follows:</p> <ul style="list-style-type: none"> <li>a. Dispatch NPO to secure VC sump pumps and RCDT pumps on Waste Disposal panel</li> <li>b. Dispatch NPO to align and reset MCCs per SOP-EL-15</li> </ul>
<p><b>Note to examiner:</b>  The following step is designed to stop actions of RO-1 IF the CRS has transitioned to ES-1.1. The BOP will continue in RO-1 if there is transition to other procedures, but any time ES-1.1 is entered, the BOP will inform the CRS of automatic action verification and RO-1 will be suspended.</p>		

Op Test No.: 1 Scenario # All Event # Attachment 1 Page 36 of 38

Event Description: RO-1, BOP Operator Actions During EOPs

Time	Position	Applicant's Actions or Behavior
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	BOP	<p>Check if additional SI actions should be performed:</p> <ol style="list-style-type: none"> <li>Check if the CRS has transitioned to – ES-1.1</li> <li>Perform the following: <ul style="list-style-type: none"> <li>Inform the CRS of the status of automatic action verification</li> <li>If E-0 has been exited, THEN continue with step 17</li> <li>If E-0 has NOT been exited, then wait until E-0 is exited. When E-0 is exited, then recheck this step</li> </ul> </li> </ol>
	BOP	<p>Perform the following:</p> <ol style="list-style-type: none"> <li>Dispatch NPO to perform the following: <ul style="list-style-type: none"> <li>Close SWN-FCV-1111 and SWN-FCV-1112</li> </ul> </li> <li>Check Condensate Pumps – ONLY ONE RUNNING.</li> <li>SECURE all but one Condensate Pump</li> <li>Initiate the following section of SOP-EL-15 <ul style="list-style-type: none"> <li>Alignment of City water Cooling</li> </ul> </li> </ol>
	BOP	<p>Reset Containment isolation Phase A and Phase B as follows:</p> <ol style="list-style-type: none"> <li>PLACE switches for letdown orifice isolation valves to CLOSE: <ul style="list-style-type: none"> <li>200A</li> <li>200B</li> <li>200C</li> </ul> </li> <li>RESET Phase A</li> <li>RESET Phase B, if actuated</li> </ol>

Op Test No.:	<u>1</u>	Scenario #	<u>All</u>	Event #	<u>Attachment 1</u>	Page	<u>37</u>	of	<u>38</u>
Event Description: RO-1, BOP Operator Actions During EOPs									
Time	Position	Applicant's Actions or Behavior							

	BOP	<p>Establish Instrument Air and Nitrogen to containment:</p> <ol style="list-style-type: none"> <li>Establish IA to containment: <ul style="list-style-type: none"> <li>Check INST AIR LOW PRESS alarm on panel SJF – CLEAR</li> <li>DEPRESS Inst Air reset pushbutton 28</li> <li>CHECK IA-PCV-1228, Inst Air to Cont. – OPEN</li> </ul> </li> <li>ESTABLISH PRZR PORV N2 supply: <ul style="list-style-type: none"> <li>PRESS Accumulator N2 Supply Reset pushbutton 44</li> <li>Check 863, Accumulator N2 Supply Valve – OPEN</li> </ul> </li> </ol>
	BOP	<p>Check if one non-essential Service Water pump should be started:</p> <ol style="list-style-type: none"> <li>Check Off-Site power to at least one Non-Essential service Water Pump – AVAILABLE</li> <li>Check SWN-FCV-1111 and SWN-FCV-1112 – CLOSED</li> <li>START one Non-Essential Service Water pump</li> </ol>
	BOP	<p>Check status of off-site power:</p> <ol style="list-style-type: none"> <li>VERIFY all AC Busses: <ul style="list-style-type: none"> <li>Energized by off-site power AND</li> <li>All 480V tie breakers open</li> </ul> </li> </ol>

Op Test No.: 1 Scenario # All Event # Attachment 1 Page 38 of 38

Event Description: RO-1, BOP Operator Actions During EOPs

Time	Position	Applicant's Actions or Behavior
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### **NOTE**

**It is permissible for operators to perform board clean-up actions (steps 22-29 of RO1, BOP OPERATOR ACTIONS DURING USE OF EOPs) while performing actions of other EOPs; provided this does not interfere with other EOPs in progress.**

**EVALUATOR NOTE: The remainder of the steps in this attachment are highlighted (High Level) action only.**

	BOP	Re-align secondary plant
	BOP	Check secondary valve position
	BOP	Check Heater Drain Pumps 31 and 32 Tripped
	BOP	Check plant equipment status
	BOP	Determine if Source Range detectors should be energized
	BOP	Start AC Oil Pumps and Stop DC Oil pumps as follows
	BOP	Check Long Term Plant status
	BOP	Inform CRS that RO-1 is complete and advise on the status of actions

Facility:	IP3	Scenario No.:	3	Op Test No.:	1
Examiners:	_____	Candidates:	_____	CRS	
	_____		_____	RO	
	_____		_____	PO	

Initial Conditions: 45% power BOL  
 32 Charging Pump OOS  
 32 Heater Drain Pump OOS  
 Small SG Tube Leak < 25 GPD

Turnover: Reduce Power and remove Main Turbine and Generator from service

Critical Tasks: Restore AC Power  
 Stop ECCS pumps

Event No.	Malf. No.	Event Type*	Event Description
1		R (RO) N (BOP) N (CRS)	Reduce power.
2	NIS7D	I (ALL)	PR NI failure high
3	MSS4D	C (RO/CRS)	Steam Flow transmitter fails low
4	EPS4F	C (BOP/CRS)	Loss of 6.9 KV bus 6 DG output breaker fail to auto close
5	EPS6 EPS4C	M (ALL)	Loss of Off Site power. Loss of 6.9 KV bus 3. Reactor trip.
6	DSG1B DSG1C OVR EPS29	C (ALL)	Two Running DGs trip. 480 volt bus 3A tie breaker trips open.
7	SIS7A	C (ALL)	Inadvertent SI

\* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

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## Scenario Event Description

### NRC Scenario 3

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The crew will assume the shift and commence a load reduction IAW POP-3.1.

Shortly after the power reduction is underway, power range channel N44 will fail high. The RO will take manual control of rods IAW ONOP-NI-1. The BOP will defeat the failed channel inputs. The CRS will determine appropriate Technical Specification action.

A Steam Flow transmitter failure will cause the associated Feedwater Regulating valve to fail in the closed direction. The crew will swap steam flow inputs IAW ONOP-RPC-1.

When the plant is stabilized, 6.9KV bus 6 will de-energize. The crew will check equipment operation IAW ONOP-EL-7. The standby Charging Pump will be started manually. Subsequently, a loss of off-site power and a loss of 6.9KV bus 3 will require reactor trip.

Subsequent to the reactor trip, 32 and 33 DGs will trip, and the tie breaker to 480V bus 3A will fail to close, requiring entry to ECA-0.0, Loss of All AC Power.

An inadvertent SI actuation will occur subsequent to the trip. 480V bus 5A will be restored by local emergency diesel start, allowing exit from ECA-0.0. The crew will then perform the action required to terminate SI.

EOP flow path: E-0 – ECA-0.0 – E-0 – ES-1.1

Indian Point Unit 3  
2003 NRC Initial License Examination  
Simulator Scenario Setup  
Scenario 3

**RESET TO IC-38**

32 Charging Pump OOS:                   OVR CVC47A 2  
  OVR CVC47C 2  
  OVR CVC47D 1  
  OVR CVC47F 2  
  OVR CVC47G 2

32 HDP Pump OOS:                   OVR FWH2A 2  
  OVR FWH2C 2  
  OVR FWH2D 1  
  OVR FWH2F 2  
  OVR FWH2G 2

EDG 32 Breaker fail to AUTO close: OVR DSG6A 1  
  OVR DSG6C 2  
  OVR DSG6D 1  
  OVR DSG6E 2  
  OVR DSG6F 2

EDG trip on reactor trip:           MAL DSG1C ACT,0,C,JPPLP4  
  MAL DSG1B ACT,0,C,JPPLP4

Bus 3A Tie Breaker fail to close:   OVR EPS29D 1  
  OVR EPS29F 2

Materials needed for scenario:

- POP-3.1
- Graph Book
- Tags for tagged equipment
- OA-99-29 (Operator Aid)
- Daily Reactivity Sheet

Allow crew to begin scenario brief approximately 30 minutes prior to entering simulator

Note: Simulator IC data sheet has Condensate Booster Pumps in Trip Pullout

Scenario built from IC 19



Indian Point Unit 3  
2003 NRC Initial License Examination  
Simulator Scenario Turnover Information  
Scenario 3

- The plant is at 45% power, steady state conditions exist.
- Beginning of Life,  $C_b$  is 1581 ppm.
- Burnup = 150 MWD/MTU
- Control Bank D = 166 steps
- $T_{avg} = 556^{\circ}\text{F}$
- RCS Pressure = 2235 psig
- Pressurizer Level on program (33%)

The following equipment is out of service:

- 31 Charging Pump. Return expected in approximately 6 hours.
- 32 Component Cooling Water Pump. Return to service in approximately 8 hours.

Crew instructions:

- The plant has been at 45% power for 2 days due to Main Generator abnormalities at higher power levels
- In accordance with POP-3.1, reduce power to 20% at 100 MWe per hour in preparation for removing the Turbine Generator from service for material inspection.
- The STA will perform 3PT-V053B, Power Reduction Surveillance Requirements

Op Test No.:	<u>1</u>	Scenario #	<u>3</u>	Event #	<u>1</u>	Page	<u>5</u>	of	<u>34</u>
Event Description:		Reduce Power.							
Time	Position	Applicant's Actions or Behavior							

	CRS	Refers to POP-3.1, step 4.1
	CRS	CONDUCT a brief using Attachment 7, POP-3.1 Briefing Guide
	CRS	INITIATE performance of the following attachments as required: <ul style="list-style-type: none"> <li>Attachment 1, Watch Routines/Operating Limits</li> <li>Attachment 6, POP-3.1 Expected Alarms</li> </ul>
	CRS	ENTER starting power level and desired ending power level
	CRS	N/A, initial, and date all inappropriate steps
	CRS	Obtain Shift Manager permission to reduce load and continue performance of this attachment.
	CRS	Notify Entergy system operator of load reduction

Op Test No.: 1 Scenario # 3 Event # 1 Page 6 of 34

Event Description: Reduce Power.

Time	Position	Applicant's Actions or Behavior
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	CRS	Commence performance of 3PT-V053B, Power Reduction Surveillance Requirements. <b>Note: STA will perform</b>
	BOP	Initiate generator load decrease to desired generator load at desired rate using any of the following: <ul style="list-style-type: none"> <li>o Governor (preferred)</li> <li>o Load Limit 1</li> <li>o Load Limit 2</li> </ul>
	BOP	Adjust Feedwater Regulators manual setpoint to null manual-auto deviation: <ul style="list-style-type: none"> <li>o Maintain FW Regulators nulled while continuing with this attachment</li> </ul>
	RO	<u>WHEN</u> Turbine power is approximately 40%, <u>THEN</u> VERIFY Power Below C-20 lamp illuminates
	RO	Initiates boration IAW SOP-CVCS-3
<p style="text-align: center;"><b>NOTE</b></p> <p>Reactivity changes shall be closely monitored by observation of different parameters such as NIs, MWs, Tavg, Tref, Control Rods, and <math>\Delta T</math></p>		
	RO	Determine required increase in boron concentration

Op Test No.: 1 Scenario # 3 Event # 1 Page 7 of 34

Event Description: Reduce Power.

Time	Position	Applicant's Actions or Behavior
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	RO	<p>Determine the volume of boric acid required for boration by using any of the following:</p> <ul style="list-style-type: none"> <li>○ CCR Reactivity Summary Sheet</li> <li>○ CCR Computer program</li> <li>○ CVCS-5, Boration Nomograph Hot RCS</li> <li>○ CVCS-6, Boration Nomograph Cold RCS</li> <li>○ The Boration/Dilution book from Westinghouse (Operator Aid)</li> </ul>
	RO	Set YIC-110, Boric Acid Flow Integrator, for required volume of boron
	RO	Set FCV-110A, Boric Acid Flow Control Blender, controller to desired flow rate
	RO	Ensure Boric Acid Trans Pump speed switches are in slow
	RO	Ensure in-service Boric Acid Transfer Pump is in AUTO
	RO	Place RCS Makeup Mode Selector switch in BORATE
	RO	Turn RCS Makeup Control switch to START and return switch to NORM

Op Test No.:	<u>1</u>	Scenario #	<u>3</u>	Event #	<u>1</u>	Page	<u>8</u>	of	<u>34</u>
Event Description: Reduce Power.									
Time	Position	Applicant's Actions or Behavior							

	RO	Observe the following as applicable: <ul style="list-style-type: none"> <li>○ IF RX critical, THEN Tavg</li> <li>○ IF rods in AUTO, THEN control bank position</li> <li>○ IF RX subcritical, THEN count rate</li> </ul>
	RO	IF any of the following occurs, THEN immediately STOP boration: <ul style="list-style-type: none"> <li>○ Rod motion is in wrong direction or becomes blocked</li> <li>○ Subcritical count rate increases AND a deliberate approach to criticality is NOT in progress</li> <li>○ Tavg increases</li> <li>○ Axial flux target band is exceeded</li> <li>○ RCP seal injection flow becomes erratic</li> </ul>
<p style="text-align: center;"><b><u>NOTE</u></b></p> WHEN boric acid integrator reaches preset value, THEN boration will automatically terminate		
	RO	IF performing additional boration without flushing of lines, THEN DEPRESS Integrator Reset P.B. <ul style="list-style-type: none"> <li>○ Return to Step 4.4.8 (Turn RCS Makeup control switch to START and RETURN switch to NORM)</li> </ul>
	RO	WHEN boration operation is complete, THEN FLUSH makeup lines with a minimum of 20 gallons of blended makeup per Step 4.2
<p><b><i>Proceed to Event 2 at Lead Evaluator's discretion</i></b></p>		

Op Test No.: 1 Scenario # 3 Event # 2 Page 9 of 34

Event Description: PR NI Failure

Time	Position	Applicant's Actions or Behavior
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*Booth Instructor: When directed, insert the following command:*  
**MAL NIS7D ACT,200,480,0**

	CRS	Refers to ONOP-NI-1
	RO	May place rod control in MANUAL
	CRS	Go to attachment 3
	RO	Place rod control in MANUAL
	RO	Maintain Tave on program with Tref <ul style="list-style-type: none"> <li>○ Adjust control rods in manual</li> <li>○ Adjust turbine load or boron concentration as necessary</li> </ul>

**CAUTION**

If core operating above 75% power with one excore nuclear channel out of service, Technical Specifications require that a core quadrant power balance be determined (PER RA-11.1) at least once per day using movable incore instrumentation

**NOTE**

Refer to Tech Specs Table 3.3.1-1 (Completion times associated with Function 17 have 1 hour completion times)

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Op Test No.:	<u>1</u>	Scenario #	<u>3</u>	Event #	<u>2</u>	Page	<u>10</u>	of	<u>34</u>
Event Description:		PR NI Failure							
Time	Position	Applicant's Actions or Behavior							

	CREW	Verify only 1 Power Range Channel inoperable
	BOP	Remove affected channel from service as per SOP-NI-1 (Evaluator Note: Procedure for removing N-44 from service is attached to back of scenario guide)
	CRS	Refers to Tech Specs 3.2.3, 3.2.4, 3.3.1
<b>Proceed to Event 3 when directed by the Lead Evaluator or upon instruction to place rods in AUTO</b>		

Op Test No.:	<u>1</u>	Scenario #	<u>3</u>	Event #	<u>3</u>	Page	<u>11</u>	of	<u>34</u>
Event Description: Steam Flow Transmitter fails low									
Time	Position	Applicant's Actions or Behavior							

*Booth Instructor: When directed, insert the following command:*  
**MAL MSS4D ACT,0,180,0**

	CRS	Refers to ONOP-RPC-1, Instrument Failures.
	CREW	Verify the following controls: <ul style="list-style-type: none"> <li>○ Turbine load – STABLE</li> <li>○ Rod Control – STABLE</li> <li>○ PRZR pressure control – NORMAL</li> <li>○ PRZR level control – NORMAL</li> <li>○ MBFP Speed – NORMAL</li> <li>○ SG levels – NORMAL(<b>NO</b>)</li> </ul>
	CREW	PERFORM the following: <ul style="list-style-type: none"> <li>○ If affected instrument has caused a turbine runback, then perform the following:               <ul style="list-style-type: none"> <li>○ OPEN 31 DC Distribution panel, circuit 16</li> <li>○ OPEN 32 DC Distribution panel, circuit 16</li> </ul> </li> <li>○ If SG control is affected, then place affected SG transfer switches to non-affected channel (Flight Panel)               <ul style="list-style-type: none"> <li>○ <b>STM GEN NO 32 STM FL CONT TRANSFER</b></li> <li>○ <b>STM GEN NO 32 FW FL CONT TRANSFER</b></li> </ul> </li> <li>○ If automatic control has failed, then perform the following:               <ul style="list-style-type: none"> <li>○ Place affected control system in MANUAL</li> <li>○ Control affected system to stabilize plant conditions</li> </ul> </li> </ul>



Op Test No.: 1 Scenario # 3 Event # 3 Page 12 of 34

Event Description: Steam Flow Transmitter fails low

Time	Position	Applicant's Actions or Behavior
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**NOTE**

- Positive reactivity additions using control rods require CRS or SM approval and shall be made slowly and incrementally
- Substeps of step 2 may be performed in any order
- If a bistable failure is suspected with no other indications, then entry into the appropriate attachment is permitted

	RO	Check the following instrumentation: <ul style="list-style-type: none"> <li>○ RCS loop temperatures normal</li> <li>○ Check <math>\Delta T</math> setpoints               <ul style="list-style-type: none"> <li>○ Power Range channels</li> <li>○ Overpower <math>\Delta T</math></li> <li>○ Overtemperature <math>\Delta T</math></li> </ul> </li> <li>○ RCS coolant loop flow channels</li> <li>○ PRZR instrumentation</li> </ul>
	RO	Check SG Instrumentation – NORMAL <ul style="list-style-type: none"> <li>○ SG Levels</li> <li>○ SG Pressures</li> <li>○ SG Feedwater Flow</li> <li>○ SG Steam Flow (<b>NO</b>)</li> </ul>
	CRS	Go to Attachment 11, SG Steam Flow Channel Failures
	BOP	Perform Attachment 11 <b>(Evaluator note: Attachment 11 is attached to the back of this scenario guide)</b>

***When Attachment 11 is complete or at the discretion of the Lead Evaluator, proceed to Event 4***

Op Test No.: 1 Scenario # 3 Event # 4 Page 13 of 34

Event Description: Loss of 6.9 KV Bus 6; DG Output Breaker Fail to Auto Close

Time	Position	Applicant's Actions or Behavior
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*Booth Instructor: When directed, insert the following command:***MAL EPS4F ACT**

	CRS	Refers to ONOP-EL-7, Loss of a 480 Volt Bus Above Cold Shutdown
	RO	Check RCP seal cooling <ul style="list-style-type: none"> <li>○ Check charging pumps – ANY RUNNING</li> <li>○ Start Charging pump</li> <li>○ Control speed to maintain 6-12 gpm seal injection</li> </ul>
	BOP	Check Service Water Header Pressure – GREATER THAN 60 psig <ul style="list-style-type: none"> <li>○ Non-Essential Header</li> <li>○ Essential Header               <ul style="list-style-type: none"> <li>○ Start 34 Service Water Pump</li> </ul> </li> </ul>
	BOP	Check status of Circ Pumps <ul style="list-style-type: none"> <li>○ At least one per condenser running</li> <li>○ All running               <ul style="list-style-type: none"> <li>○ Reduce load as necessary to maintain greater than 25.5" vacuum</li> <li>○ Refer to ONOP-RW-2 if necessary</li> </ul> </li> </ul>

Op Test No.: 1 Scenario # 3 Event # 4 Page 14 of 34

Event Description: Loss of 6.9 KV Bus 6; DG Output Breaker Fail to Auto Close

Time	Position	Applicant's Actions or Behavior
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**NOTE**

- TSB 3.8.9 states the cross-tie between bus 5A and 2A, and the cross-tie between bus 3A and 6A shall be open above Mode 5
- Rod bottom lights and rod position indicators will only indicate correctly if Bus 2A and MCC-36C are energized
- It is acceptable for FCV-111A to be in AUTO and closed

	RO	Check in- service Boric Acid Transfer Pump running
	BOP	Check EDG status <ul style="list-style-type: none"> <li>○ Check EDG for affected 480V bus - energized by EDG <b>(NO)</b></li> </ul>
	RO/BOP	Check ABFP status <ul style="list-style-type: none"> <li>○ Check ABFPs – ANY RUNNING <b>(NO)</b></li> </ul>
	CREW	Check any waste release in progress <b>(NO)</b>
	BOP	Check Service Water Headers – Between 60 psig and 97.5 psig <ul style="list-style-type: none"> <li>○ Non-Essential</li> <li>○ Essential</li> </ul>

Op Test No.: 1 Scenario # 3 Event # 4 Page 15 of 34

Event Description: Loss of 6.9 KV Bus 6; DG Output Breaker Fail to Auto Close

Time	Position	Applicant's Actions or Behavior
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**CAUTION**

Different CCW pump combinations could result in surge tank levels changes

	BOP	Check Component Cooling Water status: <ul style="list-style-type: none"> <li>○ Check CCW low pressure alarms on panel SGF – CLEAR</li> <li>○ Check CCW pumps – 3 running               <ul style="list-style-type: none"> <li>○ Verify Thermal Barrier cooling established                   <ul style="list-style-type: none"> <li>▪ Thermal Barrier CCW Header Low flow alarm on panel SGF – CLEAR</li> </ul> </li> </ul> </li> </ul>
	RO	Verify Seal Injection flows – BETWEEN 6 and 12 gpm
	BOP	Check IA header pressure greater than 90 psig
	BOP	Check 480V busses energized by 6.9 KV busses <ul style="list-style-type: none"> <li>○ Check bus 6A – ENERGIZED BY 6.9 KV Bus <b>(NO)</b></li> </ul>
	CRS	Go to Attachment 2
	BOP	Performs Attachment 2 <b>(Evaluator note: Attachment 2 is attached to the back of this scenario guide)</b>

Op Test No.: 1 Scenario # 3 Event # 4 Page 16 of 34

Event Description: Loss of 6.9 KV Bus 6; DG Output Breaker Fail to Auto Close

Time	Position	Applicant's Actions or Behavior
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	CRS	Evaluate Tech Spec impact <ul style="list-style-type: none"><li>○ LCO 3.8.1</li><li>○ LCO 3.8.9</li></ul>
<b><i>When NPO is directed to shut down 32 EDG or at discretion of Lead Evaluator, proceed to Event 5</i></b>		

Op Test No.: 1 Scenario # 3 Event # 5, 6, 7 Page 17 of 34

Event Description: Loss of Off-Site Power. Running DGs Trip. Inadvertent SI

Time	Position	Applicant's Actions or Behavior
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*Booth Instructor: When directed, insert the following command:***MAL EPS6 ACT (Station Aux Transformer failure)****MAL EPS4C ACT (Loss of 6.9 KV Bus 3)**

	CREW	Determine Loss of Off-Site power has occurred. Loss of 6.9 KV Bus 3 has occurred. Reactor Trip.
	CRS	Opens E-0, Reactor Trip or Safety Injection <b>(May go directly to ECA-0.0)</b>
	RO	Verify Reactor Trip <ul style="list-style-type: none"> <li>○ Reactor trip and Bypass breakers open</li> <li>○ Rod bottom lights lit</li> <li>○ Rod position indication less than 20 steps</li> <li>○ Neutron flux decreasing</li> </ul>
	RO	Verify turbine trip <ul style="list-style-type: none"> <li>○ All turbine stop valves closed</li> </ul>
	BOP	Verify all 480V AC Busses energized by offsite power <b>(NO)</b>
	CRS	Directs transition to ECA-0.0, Loss of All AC Power

Op Test No.: 1 Scenario # 3 Event # 5, 6, 7 Page 18 of 34

Event Description: Loss of Off-Site Power. Running DGs Trip. Inadvertent SI

Time	Position	Applicant's Actions or Behavior
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**NOTE**

- CSF Status Trees should be monitored for information only. FRPs should NOT be implemented.
- Normal communication channels may be unavailable without AC power. Radios should be used by watch personnel outside the control room

	RO	Verify Reactor Trip <ul style="list-style-type: none"><li>○ Reactor trip and Bypass breakers open</li><li>○ Neutron flux decreasing</li></ul>
	RO	Isolate Main Steam <ul style="list-style-type: none"><li>○ Manually close all MSIVs</li><li>○ Check MSIV Bypass valves closed</li></ul>

**Booth Instructor:**

*If request has been made to restore EDG Power Supply to 480 volt busses, Start 33 EDG NOW by inserting the following commands:*

**MAL DSG1C CLR**  
**LOA DSG30 T**

*If request has NOT been made yet, be prepared to start 33 EDG IMMEDIATELY when requested in step 6.a of ECA-0.0 using the commands above*

Op Test No.: 1 Scenario # 3 Event # 5, 6, 7 Page 19 of 34

Event Description: Loss of Off-Site Power. Running DGs Trip. Inadvertent SI

Time	Position	Applicant's Actions or Behavior
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	RO	<p>Check if RCS is isolated:</p> <ul style="list-style-type: none"> <li>○ Check PRZR PORVs closed</li> <li>○ Close Letdown Isolation Valves <ul style="list-style-type: none"> <li>○ 459</li> <li>○ 460</li> <li>○ 200A-C</li> </ul> </li> <li>○ Check Excess Letdown stop valves closed <ul style="list-style-type: none"> <li>○ CH-AOV-213A</li> <li>○ CH-AOV-213B</li> </ul> </li> <li>○ Check Resid HR LP Bypass To Demin closed <ul style="list-style-type: none"> <li>○ CH-HCV-133</li> </ul> </li> <li>○ Close sample isolation valves <ul style="list-style-type: none"> <li>○ SP-AOV-956A,C,E,G</li> <li>○ SP-AOV-956B,D,F,H</li> </ul> </li> <li>○ Secure any radwaste release in progress</li> </ul>
	BOP	<p>Maintain SG levels using Turbine driven AFW pump</p> <ul style="list-style-type: none"> <li>○ Check 32 AFW pump running</li> <li>○ Maintain 32 AFW pump discharge pressure greater than or equal to 150 psi above highest SG pressure <ul style="list-style-type: none"> <li>○ Adjust HC-118, ABFP Turb Speed control</li> <li>○ Check SG levels – ANY greater than 9% (<b>NO</b>)</li> </ul> </li> <li>○ Maintain AFW flow greater than 365 gpm until 1 NR SG level is &gt;9% <ul style="list-style-type: none"> <li>○ Preferentially restore level to 32 or 33 SG first</li> <li>○ Establish level in 1 SG at a time and maintain feed flow to other SGs less than 100 gpm</li> </ul> </li> </ul>



Op Test No.: 1 Scenario # 3 Event # 5, 6, 7 Page 20 of 34

Event Description: Loss of Off-Site Power. Running DGs Trip. Inadvertent SI

Time	Position	Applicant's Actions or Behavior
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**CAUTION**

An Essential Service Water pump should be kept available to automatically load on its 480V bus to provide diesel generator cooling

	BOP/ RO	<p>Determine status of Bus 2A and 3A</p> <ul style="list-style-type: none"> <li>○ Check bus 2A and 3A – EITHER energized (<b>YES</b>)</li> <li>○ Attempt to close Bus no. 2A to 3A tie</li> <li>○ Check Bus 2A energized</li> <li>○ Check the following equipment running <ul style="list-style-type: none"> <li>○ 32 CCW pump</li> <li>○ 32 Service Water pump</li> </ul> </li> </ul>
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**CAUTION**

Use extreme caution whenever attempting AC power restoration from multiple sources simultaneously

*Booth Instructor: When requested, and prior to procedure step 6.d, immediately Emergency start 33 EDG:*

**MAL DSG1C CLR (Clears malfunction)**

**LOA DSG30 T (Resets the trip)**

*Report that 32 EDG 86 relay would NOT reset*

CRITICAL TASK	CRS	<p>Try to restore power to any 480V AC safeguards bus</p> <ul style="list-style-type: none"> <li>○ Dispatch NPO to emergency start all EDGs and energize any 480V bus per SOP-EL-1</li> <li>○ Contact and inform CON ED D.O. of urgent need for AC power</li> <li>○ Attempt to energize any 480V AC bus using any of the following: <ul style="list-style-type: none"> <li>○ EDGs per SOP-EL-1</li> <li>○ Offsite power per SOP-EL-5</li> </ul> </li> </ul>
	CRS	<p>Check 480V AC Safeguards busses – ANY Energized</p> <ul style="list-style-type: none"> <li>○ 2A and 5A – (<b>YES</b>)</li> </ul>

Op Test No.: 1 Scenario # 3 Event # 5, 6, 7 Page 21 of 34

Event Description: Loss of Off-Site Power. Running DGs Trip. Inadvertent SI

Time	Position	Applicant's Actions or Behavior
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	BOP	Verify at least 2 ESW pumps running (YES)
<i>Booth Instructor: When BOP verifies 2 ESW pumps running, insert the following command:</i> <b>MAL SIS7A ACT</b>		
	CRS	Check ECA-0.0, entered directly (YES OR NO)
	CRS	Go to E-0, Reactor Trip or Safety Injection (Step 1 or 3)
	RO	Verify reactor trip: <ul style="list-style-type: none"> <li>○ Reactor trip and bypass breakers open</li> <li>○ Rod bottom lights lit</li> <li>○ Rod position indicators less than 20 steps</li> <li>○ Neutron flux decreasing</li> </ul>
	RO	Verify Turbine Trip: <ul style="list-style-type: none"> <li>○ Verify all turbine stop valves closed</li> </ul>
	BOP	Verify 480V AC Busses – All energized by offsite power

Op Test No.: 1 Scenario # 3 Event # 5, 6, 7 Page 22 of 34

Event Description: Loss of Off-Site Power. Running DGs Trip. Inadvertent SI

Time	Position	Applicant's Actions or Behavior
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	Crew	<p>Determine if SI is actuated</p> <ul style="list-style-type: none"> <li>○ Any SI annunciator lit</li> <li style="text-align: center;">OR</li> <li>○ SI pumps – ANY RUNNING (YES) <ul style="list-style-type: none"> <li>○ Manually actuate SI</li> <li>○ Close MSIVs</li> </ul> </li> </ul>
	BOP	<p>Check AFW status:</p> <ul style="list-style-type: none"> <li>○ Verify total AFW flow – greater than 365 gpm</li> <li>○ Control feed flow to maintain SG NR levels between 9%(14%) and 50%</li> </ul>
<p style="text-align: center;"><b><u>CAUTION</u></b></p> <p>Starting of equipment must be coordinated with all control room operators to ensure that two components are NOT started at the same time on the same power supply</p>		
	CRS	Direct BOP operator to perform RO-1, BOP operator actions during use of EOPs (steps begin on page 27 of this guide)
	RO	<p>Verify Feedwater Isolation:</p> <ul style="list-style-type: none"> <li>○ Verify MBFPs tripped</li> <li>○ Verify MBFP discharge valves closed <ul style="list-style-type: none"> <li>○ BFD-MOV-2-31</li> <li>○ BFD-MOV-2-32</li> </ul> </li> <li>○ Verify Main and Bypass feedwater isolated <ul style="list-style-type: none"> <li>○ Main and Bypass FW MOVs closed</li> <li style="text-align: center;">OR</li> <li>○ Main (SNF panel) and Bypass FW FRVs closed</li> </ul> </li> </ul>

Op Test No.: 1 Scenario # 3 Event # 5, 6, 7 Page 23 of 34

Event Description: Loss of Off-Site Power. Running DGs Trip. Inadvertent SI

Time	Position	Applicant's Actions or Behavior
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	RO	Check SG Blowdown: <ul style="list-style-type: none"> <li>○ SG Blowdown isolation valves closed</li> <li>○ SG Sample isolation valves closed</li> </ul>
	RO	Verify SI flow: <ul style="list-style-type: none"> <li>○ Check RCS pressure less than 1650 psig (2000 psig)(NO)</li> <li>○ Check HHSI pump flow indicators – Flow indicated</li> <li>○ Check RCS pressure less than 325 psig (650 psig) (NO)</li> </ul>
	RO	Verify Containment Spray NOT required: <ul style="list-style-type: none"> <li>○ Check containment pressure has remained less than 22 psig</li> </ul>
	RO	Check RCP seal cooling: <ul style="list-style-type: none"> <li>○ Verify CCW flow to RCP thermal barriers               <ul style="list-style-type: none"> <li>○ RCP BEARING COOLANT LOW FLOW alarm on panel SGF clear</li> <li>○ THERMAL BARRIER CCW HEADER LOW FLOW alarm on panel SGF clear</li> </ul> </li> <li>○ Trip RCPs</li> </ul>
Booth Instructor: When directed to open CH-288, immediately insert the following command: <b>LOA CVC34 1</b>		
	RO	Establish charging flow

Op Test No.: 1 Scenario # 3 Event # 5, 6, 7 Page 24 of 34

Event Description: Loss of Off-Site Power. Running DGs Trip. Inadvertent SI

Time	Position	Applicant's Actions or Behavior
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	RO	Check RCS Tcold temperature stable at or trending to 547°F
	RO	Check if RCPs should be stopped <ul style="list-style-type: none"> <li>o Already tripped</li> </ul>
	RO	Check PRZR PORVs, Safety Valves, and Spray Valves <ul style="list-style-type: none"> <li>o Check both PRZR PORVs – CLOSED</li> <li>o Check PRZR Safety Valves – CLOSED <ul style="list-style-type: none"> <li>o Tailpipe temperatures normal</li> <li>o Acoustic monitors normal</li> </ul> </li> <li>o Check normal PRZR Spray Valves closed</li> <li>o Check CH-AOV-212 closed</li> </ul>
	RO	Determine if SGs are faulted: <ul style="list-style-type: none"> <li>o Check SG pressures: <ul style="list-style-type: none"> <li>o ANY DECREASING IN AN UNCONTROLLED MANNER (NO)</li> </ul> </li> </ul>
	CREW	Determine if SG tubes are ruptured: <ul style="list-style-type: none"> <li>o Condenser Air ejector radiation recorder trends – NORMAL</li> <li>o SG Blowdown Radiation recorder trends – NORMAL</li> <li>o Main Steam Line radiation recorder trends – NORMAL</li> <li>o All intact SG level response – NORMAL</li> </ul>
	CREW	Determine if RCS is intact: <ul style="list-style-type: none"> <li>o Containment pressure – NORMAL</li> <li>o Containment sump level – NORMAL</li> <li>o Containment radiation – NORMAL</li> </ul>

Op Test No.: 1 Scenario # 3 Event # 5, 6, 7 Page 25 of 34

Event Description: Loss of Off-Site Power. Running DGs Trip. Inadvertent SI

Time	Position	Applicant's Actions or Behavior
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	Crew	<p>Determine if SI should be terminated:</p> <ul style="list-style-type: none"> <li>○ Check RCS subcooling based on qualified CETs greater than 40°F</li> <li>○ Check secondary heat sink <ul style="list-style-type: none"> <li>○ Total AFW to intact SGs greater than 365 psig available, OR</li> <li>○ Intact SG NR levels – ANY greater than 9% (14%)</li> </ul> </li> <li>○ RCS pressure <ul style="list-style-type: none"> <li>○ Greater than 1650 psig (2000 psig)</li> <li>○ Stable or increasing</li> </ul> </li> <li>○ Pressurizer level greater than 14%</li> </ul>
	CRS	Go to ES-1.1, SI Termination
	RO/BOP	<p>Reset SI as follows:</p> <ul style="list-style-type: none"> <li>○ Check verification of SI automatic actions of steps 2 – 12 of RO-1 is complete</li> <li>○ Press BOTH SI RESET pushbuttons on Panel SBF-2: <ul style="list-style-type: none"> <li>a. Train 1 SI Reset</li> <li>b. Train 2 SI Reset</li> </ul> </li> <li>○ Check SI – RESET <ul style="list-style-type: none"> <li>a. SI ACTUATED light – EXTINGUISHED</li> </ul> </li> </ul>

Op Test No.: 1 Scenario # 3 Event # 5, 6, 7 Page 26 of 34

Event Description: Loss of Off-Site Power. Running DGs Trip. Inadvertent SI

Time	Position	Applicant's Actions or Behavior
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	RO/BOP	Reset Containment Isolation Phase A and Phase B as follows: <ul style="list-style-type: none"> <li>Place switches for letdown orifice isolation valves to close: <ul style="list-style-type: none"> <li>200A</li> <li>200B</li> <li>200C</li> </ul> </li> <li>Reset Phase A</li> <li>Reset Phase B, if required (NO)</li> </ul>
	CRS	Direct BOP operator to initiate performance of attachment 3, Re-establishing operator control of valves following phase A reset
	RO	Establish Instrument Air to containment: <ul style="list-style-type: none"> <li>Check INST AIR LOW PRESS alarm on panel SJF clear</li> <li>Press Instr. Air Reset PB 28 on panel SMF</li> <li>Open IA-PCV-1228, Inst Air to Cont.</li> </ul>
Critical task	RO	Stop SI pumps and place in AUTO <ul style="list-style-type: none"> <li>SI pumps</li> <li>RHR pumps</li> </ul>
<b><i>Terminate scenario when SI pumps are off</i></b>		

Op Test No.: 1 Scenario # All Event # Attachment 1 Page 27 of 34

Event Description: RO-1, BOP Operator Actions During EOPs

Time	Position	Applicant's Actions or Behavior
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	BOP	<p>Monitor Control Room Annunciators:</p> <ol style="list-style-type: none"> <li>Acknowledge all Supervisory Panel Alarms as time permits</li> <li>Report all unusual alarms affecting accident response to CRS</li> <li>Monitor status of the following alarms: <ul style="list-style-type: none"> <li>HIGH CONT ATMOS TEMP/RTD FAILURE – CLEAR</li> <li>480 V SAFEGUARDS UNDERVOLTAGE – CLEAR</li> </ul> </li> </ol>
<p style="text-align: center;"><b><u>Caution</u></b></p> <p><b>Starting of equipment must be coordinated with the CRS to ensure that two components are <u>not</u> started at the same time on the same power supply.</b></p>		
	BOP	<p>Verify SI Pumps – RUNNING</p> <ol style="list-style-type: none"> <li>THREE SI pumps</li> <li>TWO RHR pumps</li> </ol>
	BOP	<p>Verify Containment FCU status:</p> <ol style="list-style-type: none"> <li>Check FCUs – ALL RUNNING</li> <li>Place FCU Damper control switch in – INCIDENT MODE position</li> <li>Check FCU dampers for all FCUs – IN INCIDENT MODE POSITION <ul style="list-style-type: none"> <li>Dampers A/B – CLOSED (inlet)</li> <li>Damper C – CLOSED (bypass)</li> <li>Damper D – OPEN (outlet)</li> </ul> </li> <li>Place control switches for 1104 and 1105 to OPEN</li> <li>Check Service Water Cooling Valves – OPEN <ul style="list-style-type: none"> <li>1104</li> <li>1105</li> </ul> </li> </ol>
	BOP	Verify SI Valve alignment – Proper Emergency Alignment



Op Test No.: 1 Scenario # All Event # Attachment 1 Page 28 of 34

Event Description: RO-1, BOP Operator Actions During EOPs

Time	Position	Applicant's Actions or Behavior
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		<ul style="list-style-type: none"> <li>a. Verify Safeguard Valve Off Normal Position alarm on panel SBF-1 – CLEAR</li> <li>b. Ensure BIT Discharge valves 1835A, 1835B – OPEN</li> <li>c. Ensure BIT Inlet valves 1852A, 1852B – OPEN</li> <li>d. Ensure High Head Stop valves 856J, 856H, 856C, 856E – OPEN</li> <li>e. If RWST purification loop in service, then secure system per SOP-SI-3</li> </ul>
	BOP	Verify ABFP status: <ul style="list-style-type: none"> <li>a. Check Motor Driven Pumps – BOTH RUNNING</li> <li>b. Check Turbine Driven Pump – RUNNING</li> </ul>
	BOP	Verify ABFP valve alignment: <ul style="list-style-type: none"> <li>a. If Motor Driven AFW pump(s) are running, ensure SG Aux FW Reg valve controllers – Set to 0% (full open)               <ul style="list-style-type: none"> <li>• FCV-406A</li> <li>• FCV-406B</li> <li>• FCV-406C</li> <li>• FCV-406D</li> </ul> </li> <li>b. Check SG Blowdown Isolation Valves - CLOSED</li> </ul>

Op Test No.: 1 Scenario # All Event # Attachment 1 Page 29 of 34

Event Description: RO-1, BOP Operator Actions During EOPs

Time	Position	Applicant's Actions or Behavior
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	BOP	Verify CCW Pump status: <ul style="list-style-type: none"> <li>a. Check CCW pumps – ALL RUNNING</li> <li>b. Check RHR HX CCW Shutoff valve – OPEN</li> </ul>
	BOP	Verify Essential Service Water Pumps – Three Running
	BOP	Verify Containment Isolation Phase A: <ul style="list-style-type: none"> <li>a. Check Phase A – ACTUATED</li> <li>b. Check Phase A valves – CLOSED               <ul style="list-style-type: none"> <li>• Refer to Attachment 2, Phase A valve closure list</li> </ul> </li> </ul>
	BOP	Verify Containment Ventilation Isolation: <ul style="list-style-type: none"> <li>a. Check Purge Valves – CLOSED               <ul style="list-style-type: none"> <li>• FCV-1170</li> <li>• FCV-1171</li> <li>• FCV-1172</li> <li>• FCV-1173</li> </ul> </li> <li>b. Check Pressure Relief valves – CLOSED               <ul style="list-style-type: none"> <li>• PCV-1190</li> <li>• PCV-1191</li> <li>• PCV-1192</li> </ul> </li> <li>c. Check WCCPP low pressure zone alarm – NOT LIT</li> <li>d. Verify IVSW Valves – OPEN               <ul style="list-style-type: none"> <li>• IV-AOV-1410</li> <li>• IV-AOV-1413</li> <li>• IV-SOV-6200</li> <li>• IV-SOV-6201</li> </ul> </li> </ul>
	BOP	Verify Emergency Diesel Generator status:

Op Test No.: 1 Scenario # All Event # Attachment 1 Page 30 of 34

Event Description: RO-1, BOP Operator Actions During EOPs

Time	Position	Applicant's Actions or Behavior
		<ul style="list-style-type: none"> <li>a. Check EDGs – ALL RUNNING</li> <li>b. Check Both EDG SWS Outlet Flow Control Valves – OPEN               <ul style="list-style-type: none"> <li>• SWN-FCV-1176</li> <li>• SWN-FCV-1176A</li> </ul> </li> <li>c. Dispatch NPO to set switches for both EDG SWS Outlet Flow Control Valves to OPEN:               <ul style="list-style-type: none"> <li>• SWN-FCV-1176</li> <li>• SWN-FCV-1176A</li> </ul> </li> </ul>
	BOP	<p>Verify Control Room Ventilation:</p> <ul style="list-style-type: none"> <li>a. SET Control Room ventilation control switch to – 10% INCIDENT MODE (switch position 3)</li> <li>b. Check Damper status Dampers A, B, F1, F2               <ul style="list-style-type: none"> <li>• A – DIM</li> <li>• B – BRIGHT</li> <li>• Either F1 OR F2 – BRIGHT</li> </ul> </li> <li>c. Verify AC Compressors and fans – ALL RUNNING               <ul style="list-style-type: none"> <li>• ACC 31A ON – BRIGHT</li> <li>• ACC 31B ON – BRIGHT</li> <li>• ACC 32A ON – BRIGHT</li> <li>• ACC 32B ON – BRIGHT</li> <li>• ACF 31 ON – BRIGHT</li> <li>• ACF 32 ON – BRIGHT</li> </ul> </li> </ul>

Op Test No.: 1 Scenario # All Event # Attachment 1 Page 31 of 34

Event Description: RO-1, BOP Operator Actions During EOPs

Time	Position	Applicant's Actions or Behavior
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	BOP	<p>Verify Emergency DC Oil Pumps status:</p> <ul style="list-style-type: none"> <li>• Main turbine emergency bearing oil pump – RUNNING</li> <li>• Dispatch NPO to verify main generator air side seal oil backup pump – RUNNING</li> <li>• MBFP DC emergency oil pump – RUNNING</li> </ul>
	BOP	<p>Reset SI as follows:</p> <ol style="list-style-type: none"> <li>Press BOTH SI RESET pushbuttons on Panel SBF-2: <ul style="list-style-type: none"> <li>• Train 1 SI Reset</li> <li>• Train 2 SI Reset</li> </ul> </li> <li>Check SI – RESET <ul style="list-style-type: none"> <li>• SI ACTUATED light – EXTINGUISHED</li> </ul> </li> </ol>
	BOP	<p>Reset MCCs as follows:</p> <ol style="list-style-type: none"> <li>Dispatch NPO to secure VC sump pumps and RCDT pumps on Waste Disposal panel</li> <li>Dispatch NPO to align and reset MCCs per SOP-EL-15</li> </ol>

**Note to examiner:**

The following step is designed to stop actions of RO-1 IF the CRS has transitioned to ES-1.1. The BOP will continue in RO-1 if there is transition to other procedures, but any time ES-1.1 is entered, the BOP will inform the CRS of automatic action verification and RO-1 will be suspended.

Op Test No.: 1 Scenario # All Event # Attachment 1 Page 32 of 34

Event Description: RO-1, BOP Operator Actions During EOPs

Time	Position	Applicant's Actions or Behavior
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	BOP	<p>Check if additional SI actions should be performed:</p> <ol style="list-style-type: none"> <li>Check if the CRS has transitioned to – ES-1.1</li> <li>Perform the following: <ul style="list-style-type: none"> <li>Inform the CRS of the status of automatic action verification</li> <li>If E-0 has been exited, THEN continue with step 17</li> <li>If E-0 has NOT been exited, then wait until E-0 is exited. When E-0 is exited, then recheck this step</li> </ul> </li> </ol>
	BOP	<p>Perform the following:</p> <ol style="list-style-type: none"> <li>Dispatch NPO to perform the following: <ul style="list-style-type: none"> <li>Close SWN-FCV-1111 and SWN-FCV-1112</li> </ul> </li> <li>Check Condensate Pumps – ONLY ONE RUNNING.</li> <li>SECURE all but one Condensate Pump</li> <li>Initiate the following section of SOP-EL-15 <ul style="list-style-type: none"> <li>Alignment of City water Cooling</li> </ul> </li> </ol>
	BOP	<p>Reset Containment isolation Phase A and Phase B as follows:</p> <ol style="list-style-type: none"> <li>PLACE switches for letdown orifice isolation valves to CLOSE: <ul style="list-style-type: none"> <li>200A</li> <li>200B</li> <li>200C</li> </ul> </li> <li>RESET Phase A</li> <li>RESET Phase B, if actuated</li> </ol>

Op Test No.: 1 Scenario # All Event # Attachment 1 Page 33 of 34

Event Description: RO-1, BOP Operator Actions During EOPs

Time	Position	Applicant's Actions or Behavior
	BOP	<p>Establish Instrument Air and Nitrogen to containment:</p> <ol style="list-style-type: none"> <li>Establish IA to containment: <ul style="list-style-type: none"> <li>Check INST AIR LOW PRESS alarm on panel SJF – CLEAR</li> <li>DEPRESS Inst Air reset pushbutton 28</li> <li>CHECK IA-PCV-1228, Inst Air to Cont. – OPEN</li> </ul> </li> <li>ESTABLISH PRZR PORV N2 supply: <ul style="list-style-type: none"> <li>PRESS Accumulator N2 Supply Reset pushbutton 44</li> <li>Check 863, Accumulator N2 Supply Valve – OPEN</li> </ul> </li> </ol>
	BOP	<p>Check if one non-essential Service Water pump should be started:</p> <ol style="list-style-type: none"> <li>Check Off-Site power to at least one Non-Essential service Water Pump – AVAILABLE</li> <li>Check SWN-FCV-1111 and SWN-FCV-1112 – CLOSED</li> <li>START one Non-Essential Service Water pump</li> </ol>
	BOP	<p>Check status of off-site power:</p> <ol style="list-style-type: none"> <li>VERIFY all AC Busses: <ul style="list-style-type: none"> <li>Energized by off-site power</li> <li>AND</li> <li>All 480V tie breakers open</li> </ul> </li> </ol>

Op Test No.: 1 Scenario # All Event # Attachment 1 Page 34 of 34

Event Description: RO-1, BOP Operator Actions During EOPs

Time	Position	Applicant's Actions or Behavior
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### **NOTE**

**It is permissible for operators to perform board clean-up actions (steps 22-29 of RO1, BOP OPERATOR ACTIONS DURING USE OF EOPs) while performing actions of other EOPs; provided this does not interfere with other EOPs in progress.**

**EVALUATOR NOTE: The remainder of the steps in this attachment are highlighted (High Level) action only.**

	BOP	Re-align secondary plant
	BOP	Check secondary valve position
	BOP	Check Heater Drain Pumps 31 and 32 Tripped
	BOP	Check plant equipment status
	BOP	Determine if Source Range detectors should be energized
	BOP	Start AC Oil Pumps and Stop DC Oil pumps as follows
	BOP	Check Long Term Plant status
	BOP	Inform CRS that RO-1 is complete and advise on the status of actions

Facility: IP3 Scenario No.: 4 Op Test No.: 1

Examiners: \_\_\_\_\_ Candidates: \_\_\_\_\_ CRS  
 \_\_\_\_\_ RO  
 \_\_\_\_\_ PO

Initial Conditions: 94% power EOL  
 32 Charging Pump OOS  
 31 AFW Pump OOS  
 Small SG Tube Leak < 25 GPD

Turnover: Main Condenser rupture disc is leaking. Reduce Power to 50 MWe at 200 MWe per hour and remove Main Turbine and Generator from service

Critical Tasks: Manual Turbine Trip  
 Initiate Emergency Boration

Event No.	Malf. No.	Event Type*	Event Description
1		R (RO) N (BOP) N (CRS)	Reduce load
2	TUR10B	I (CRS)	First Stage Shell Pressure PT-412B fails low
3	MSS3	I (RO) I (CRS)	Steam Pressure transmitter 404 fails high
4	CCW1A		CCW Pump Trip.
5	RCS10C RCS7C	C (ALL)	RCP TBHX leak. RCP vibration
6	XMT38 XMT39 XMT40	M (ALL)	RCP sheared shaft; ATWS
7	TUR2A TUR2B	C (RO)	Turbine Trip failure
8	CVC16	C (ALL)	Boration failure

\* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor



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## Scenario Event Description

### NRC Scenario 4

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The crew will assume the shift and initiate a load decrease in accordance with POP-2.1.

First Stage Shell Pressure transmitter PT-412B will fail low. The crew will place steam dumps in Pressure Control Mode and will bypass AMSAC IAW ONOP-RPC-1. The CRS will refer to Technical Specifications.

When actions are complete, Steam pressure transmitter PT-404 will fail high, causing Feed Pump speed to increase and Feed Regulating Valves to throttle closed. The crew will respond by placing Feed Pump Speed Control and steam dumps in manual IAW ONOP-FW-1.

A running CCW pump will trip. The standby pump will automatically start. The crew will respond IAW ONOP-CC-1. A TBHX leak will develop, and manual action to isolate the TBHX will be taken IAW ONOP-CC-2.

During the TBHX tube leak, RCP vibration will rise, eventually resulting in failure of the RCP shaft. The crew will refer to ARP-13 and ONOP-RCS-5. A reactor trip will be required based on Low RCS Loop Flow, but will not automatically occur.

The RO will attempt to manually trip the reactor, but the reactor will not trip. The turbine must be manually tripped, and emergency boration will fail, requiring an alternate method to be used for emergency boration.

EOP flow path: E-0 – FR-S.1 – E-0 – ES-0.1

Indian Point Unit 3  
2003 NRC Initial License Examination  
Simulator Scenario Setup  
Scenario 4

**RESET TO IC-39**

32 Charging Pump OOS:

OVR CVC47A 2  
OVR CVC47C 2  
OVR CVC47D 1  
OVR CVC47F 2

31 ABFP OOS:

OVR AFW9A 2  
OVR AFW9C 2  
OVR AFW9D 1  
OVR AFW9F 2

ATWS:

MAL RPS2A ACT  
MAL RPS2B ACT  
OVR EPS24D,2,0  
OVR EPS24G,2,0  
OVR EPS17D,2,0  
OVR EPS17G,2,0

Boration failure:

OVR CVC16A 1  
OVR CVC16C 1  
OVR CVC16D 2  
OVR CVC16B 2

Materials needed for scenario:

- POP-2.1
- Graph Book
- Tags for tagged equipment
- OA-99-29 (Operator Aid)
- Daily Reactivity Sheet

Allow crew to begin scenario brief approximately 30 minutes prior to entering simulator

Note: Simulator IC data sheet has Condensate Booster Pumps in Trip Pullout

Scenario built from IC 12

Indian Point Unit 3  
2003 NRC Initial License Examination  
Simulator Scenario Turnover Information  
Scenario 4

- The plant is at 94% power, steady state conditions exist.
- End of Life,  $C_b$  is 14 ppm.
- Burnup = 23135 MWD/MTU
- Control Bank D = 213 steps
- $T_{avg} = 565.3^{\circ}\text{F}$
- RCS Pressure = 2235 psig
- A small Steam Generator Tube Leak exists on 33 SG, less than 5 gallons per day.

The following equipment is out of service:

- 32 Charging Pump. Return expected in approximately 6 hours.
- 31 Auxiliary Boiler Feed Pump. Return to service in approximately 8 hours. Action of ITS 3.7.5.b entered 4 hours ago.

Crew instructions:

- One LP Turbine Main Condenser Rupture Disc is leaking.
- In accordance with POP-2.1, reduce generator load to 50 MWe at a rate of 200 MWe per hour and remove the Main Turbine and Generator from service to facilitate rupture disc repair.

Op Test No.: 1 Scenario # 4 Event # 1 Page 5 of 29

Event Description: Reduce Load

Time	Position	Applicant's Actions or Behavior
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	CRS	Refers to POP-2.1, step 4.3.1 <ul style="list-style-type: none"> <li>Refer to Attachment 1, Watch Routines/Operating Requirements</li> </ul>
	CRS	Refers to POP-2.1, step 4.3.2 <ul style="list-style-type: none"> <li>Go to Attachment 3, Reactor Power Reduction Checklist, for lowering plant load</li> </ul>
	CRS	Enter starting power level and desired ending power level
	CRS	Record reason for load reduction
	CRS	Ensure a reactivity calculation for power reduction is performed. (Attachment 5 may be used as necessary)
	CRS	If reactor power is less than 100%, then N/A, initial, and date all inappropriate steps
	CRS	Obtain Shift Manager permission to reduce load and continue performance of this attachment.
	CRS	Notify Entergy system operator of load reduction

Op Test No.: 1 Scenario # 4 Event # 1 Page 6 of 29

Event Description: Reduce Load

Time	Position	Applicant's Actions or Behavior
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	CRS	Commence performance of 3PT-V053B, Power Reduction Surveillance Requirements.
	CRS	Perform a reactivity briefing for pending load change
	RO	If RCS boron concentration will be changed by 10ppm or greater, then energize all PRZR backup heaters
	BOP	Initiate generator load decrease to desired generator load at desired rate using any of the following: <ul style="list-style-type: none"> <li>o Governor (preferred)</li> <li>o Load Limit 1</li> <li>o Load Limit 2</li> </ul>
	BOP	Adjust Feedwater Regulators manual setpoint to null manual-auto deviation: <ul style="list-style-type: none"> <li>o Maintain FW Regulators nulled while continuing with this attachment</li> </ul>
	RO	Initiates boration IAW SOP-CVCS-3
<p style="text-align: center;"><b>NOTE</b></p> <p>Reactivity changes shall be closely monitored by observation of different parameters such as NIs, MWs, Tavg, Tref, Control Rods, and <math>\Delta T</math></p>		
	RO	Determine required increase in boron concentration

Op Test No.: 1 Scenario # 4 Event # 1 Page 7 of 29

Event Description: Reduce Load

Time	Position	Applicant's Actions or Behavior
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	RO	Determine the volume of boric acid required for boration by using any of the following: <ul style="list-style-type: none"> <li>○ CCR Reactivity Summary Sheet</li> <li>○ CCR Computer program</li> <li>○ CVCS-5, Boration Nomograph Hot RCS</li> <li>○ CVCS-6, Boration Nomograph Cold RCS</li> <li>○ The Boration/Dilution book from Westinghouse (Operator Aid)</li> </ul>
	RO	Set YIC-110, Boric Acid Flow Integrator, for required volume of boron
	RO	Set FCV-110A, Boric Acid Flow Control Blender, controller to desired flow rate
	RO	Ensure Boric Acid Trans Pump speed switches are in slow
	RO	Ensure in-service Boric Acid Transfer Pump is in AUTO
	RO	Place RCS Makeup Mode Selector switch in BORATE
	RO	Turn RCS Makeup Control switch to START and return switch to NORM

Op Test No.: 1 Scenario # 4 Event # 1 Page 8 of 29

Event Description: Reduce Load

Time	Position	Applicant's Actions or Behavior
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	RO	<p>Observe the following as applicable:</p> <ul style="list-style-type: none"> <li>○ IF RX critical, THEN Tavg</li> <li>○ IF rods in AUTO, THEN control bank position</li> <li>○ IF RX subcritical, THEN count rate</li> </ul>
	RO	<p>IF any of the following occurs, THEN immediately STOP boration:</p> <ul style="list-style-type: none"> <li>○ Rod motion is in wrong direction or becomes blocked</li> <li>○ Subcritical count rate increases AND a deliberate approach to criticality is NOT in progress</li> <li>○ Tavg increases</li> <li>○ Axial flux target band is exceeded</li> <li>○ RCP seal injection flow becomes erratic</li> </ul>
<p style="text-align: center;"><b><u>NOTE</u></b></p> <p>WHEN boric acid integrator reaches preset value, THEN boration will automatically terminate</p>		
	RO	<p>IF performing additional boration without flushing of lines, THEN DEPRESS Integrator Reset P.B.</p> <ul style="list-style-type: none"> <li>○ Return to Step 4.4.8 (Turn RCS Makeup control switch to START and RETURN switch to NORM)</li> </ul>
	RO	<p>WHEN boration operation is complete, THEN FLUSH makeup lines with a minimum of 20 gallons of blended makeup per Step 4.2</p>
<p><b><i>Proceed to Event 2 at Lead Evaluator's discretion</i></b></p>		

Op Test No.: 1 Scenario # 4 Event # 2 Page 9 of 29

Event Description: First Stage Shell Pressure PT-412B Fails Low

Time	Position	Applicant's Actions or Behavior
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*Booth Instructor: When directed, insert the following command:*  
**MAL TUR10B ACT,0,120,0**

	CRS	Refers to ONOP-RPC-1, Instrument Failures
	CREW	Verify the following controls: <ul style="list-style-type: none"> <li>○ Turbine load – STABLE</li> <li>○ Rod Control – STABLE</li> <li>○ PRZR pressure control – NORMAL</li> <li>○ PRZR level control – NORMAL</li> <li>○ MBFP Speed – NORMAL</li> <li>○ SG levels – NORMAL</li> </ul>
<p style="text-align: center;"><b><u>NOTE</u></b></p> <ul style="list-style-type: none"> <li>○ Positive reactivity additions using control rods require CRS or SM approval and shall be made slowly and incrementally</li> <li>○ Substeps of step 2 may be performed in any order</li> <li>○ If a bistable failure is suspected with no other indications, then entry into the appropriate attachment is permitted</li> </ul>		
	RO	Check the following instrumentation: <ul style="list-style-type: none"> <li>○ RCS loop temperatures normal</li> <li>○ Check <math>\Delta T</math> setpoints               <ul style="list-style-type: none"> <li>○ Power Range channels</li> <li>○ Overpower <math>\Delta T</math></li> <li>○ Overtemperature <math>\Delta T</math></li> </ul> </li> <li>○ RCS coolant loop flow channels</li> <li>○ PRZR instrumentation</li> </ul>



Op Test No.: 1 Scenario # 4 Event # 2 Page 10 of 29

Event Description: First Stage Shell Pressure PT-412B Fails Low

Time	Position	Applicant's Actions or Behavior
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	RO	Check SG Instrumentation – NORMAL <ul style="list-style-type: none"> <li>○ SG Levels</li> <li>○ SG Pressures</li> <li>○ SG Feedwater Flow</li> <li>○ SG Steam Flow</li> </ul>
	CREW	Check Turbine first stage pressure – NORMAL (NO)
	CRS	Go to attachment 12, Turbine First Stage Pressure Channel Failures
	RO/BOP	Performs attachment 12 <b>(Evaluator note: Att. 12 procedure is attached to the end of this scenario guide)</b>
<b>When attachment 12 is complete or at Lead Evaluator's discretion, proceed to Event 3</b>		

Op Test No.: 1 Scenario # 4 Event # 3 Page 11 of 29

Event Description: Steam Pressure Transmitter 404 Fails High

Time	Position	Applicant's Actions or Behavior
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*Booth Instructor: When directed, insert the following command:***MAL MSS3 ACT,1050,480,0**

	CREW	Determines that MBFP speed is increasing
	CRS	May refer to ONOP-FW-1 due to feed transient
	RO	Check MBFPs – BOTH RUNNING
	RO	Verify the following controls: <ul style="list-style-type: none"> <li>○ MBFP Speed control stable (<b>NO</b>)</li> <li>○ All SG levels stable</li> </ul>
	RO	If automatic control has failed, then perform the following: <ul style="list-style-type: none"> <li>○ Place affected control system in manual</li> <li>○ Control affected system to stabilize plant conditions</li> <li>○ Refer to attachment 2, Main Feedwater Regulating valves program DP</li> </ul>

Op Test No.: 1 Scenario # 4 Event # 3 Page 12 of 29

Event Description: Steam Pressure Transmitter 404 Fails High

Time	Position	Applicant's Actions or Behavior
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	RO	<p>Check the following conditions – NORMAL FOR PRESENT POWER LEVEL:</p> <ul style="list-style-type: none"> <li>○ Both MBFPs – RUNNING</li> <li>○ Heater Drain Pumps - RUNNING</li> <li>○ Condensate Pumps – RUNNING</li> <li>○ Check MBFP operation <ul style="list-style-type: none"> <li>○ MBFP instrumentation – NORMAL <ul style="list-style-type: none"> <li>▪ PI-404, Main Steam Header Pressure <b>(NO)</b></li> <li>▪ PI-408A, Feed Pump Discharge Pressure</li> <li>▪ PI-408B, Feed Pump Suction Pressure</li> </ul> </li> <li>○ MBFP Speed Control – OPERATING PROPERLY</li> </ul> </li> <li>○ Main Feedwater Regulating valves – MAINTAINING SG PROGRAM LEVEL</li> </ul>
	CRS	Go to attachment 4, Loss of MBFP speed control
	RO/BOP	<p>Perform attachment 4</p> <p><b>(Evaluator note: Attachment 4 procedure steps are attached to the end of this scenario guide)</b></p>
<p><b><i>When steam dump control is placed in manual or at Lead Evaluator's discretion, proceed to Event 4</i></b></p>		

Op Test No.: 1 Scenario # 4 Event # 4 Page 13 of 29

Event Description: CCW Pump Trip.

Time	Position	Applicant's Actions or Behavior
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*Booth Instructor: When directed, insert the following command:*

**MAL CCW1A ACT,0,0 (31 CCW trip)**

**MAL RCS10C ACT,40,180,300 (TBHX tube leak)**

**MAL RCS7C ACT,10,600,300 (RCP vibration)**

	CRS	Refer to ONOP-CC-1

*Note: Next event initiation is on time delay from initiation of this event.*

	BOP	<p>If one or both of the previously operating CCW pumps have tripped, then verify that the standby pump has started automatically</p> <ul style="list-style-type: none"> <li>○ 32 CCW pump</li> </ul>

#### **NOTE**

- If a tripped CCW pump is required to maintain the plant in a safe condition, then one breaker re-closure attempt (without investigation) is allowed
- Step 5.1.1 through step 5.3.3.2 actions to split CCW headers may be initiated at any time CCW surge tank level can't be maintained, while continuing with this procedure

	BOP	If levels in the CCW surge tanks are decreasing, then initiate primary water makeup to the respective surge tank(s). <b>(N/A)</b>

#### **CAUTION**

If RCP seal cooling has been lost and the RCS temperature is greater than 350°F then seal injection shall not be re-established and the reactor shall be brought to Mode 5 to minimize any further seal degradation

	BOP	If surge tank levels decrease to less than 5% level in BOTH tanks then trip all CCW pumps <b>(N/A)</b>

Op Test No.: 1 Scenario # 4 Event # 4 Page 14 of 29

Event Description: CCW Pump Trip.

Time	Position	Applicant's Actions or Behavior
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	CREW	<p>IF CCW has been lost to 32 header and cannot be restored, then perform the following before RCP motor bearing temperatures reach 200°F as read on the CFMS <b>(N/A)</b></p> <ul style="list-style-type: none"> <li>○ Manually trip the reactor</li> <li>○ Manually trip all RCPs</li> <li>○ Go to E-0, Reactor Trip or Safety Injection</li> </ul>
	CRS	<p>If any charging pump is running, then establish temporary cooling using SOP-ESP-001, Local Operation of Safe Shutdown Equipment <b>(N/A)</b></p>
<p><b>Evaluator note: Subsequent action steps 5.1 through 5.4 do not apply to this event, and are not covered in this scenario guide.</b></p>		
	BOP	<p>If the CCW pumps cannot be started, then an electrical fault could exist. Investigate and attempt to correct the fault.</p> <ul style="list-style-type: none"> <li>○ If necessary, place the 32 CCW pump on the alternate feed per SOP-EL-12</li> <li>○ Reduce Component Cooling loads as necessary</li> </ul> <p><b>(N/A)</b></p>
<p><b>A Thermal Barrier Heat Exchanger Tube leak and RCP Vibration will lead to Event 5</b></p>		

Op Test No.: 1 Scenario # 4 Event # 6, 7, 8, Page 15 of 29

Event Description: RCP Sheared Shaft; ATWS; Turbine Trip Failure; Boration Failure

Time	Position	Applicant's Actions or Behavior
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*This event was initiated via time delay on the previous event*

	CRS	Refer to ONOP-CC-2 based on CC Surge Tank in-leakage
<p style="text-align: center;"><b>NOTE</b></p> <p>AC-FCV-625, RCP Thermal Barrier Return Isolation, may close following the start of a CCW pump due to momentary flow surge</p>		
	BOP	Verify AC-FCV-625 is open <ul style="list-style-type: none"> <li>○ If AC-FCV-625 is closed, then an RCP Thermal Barrier leak may exist</li> </ul>
	CREW	Observe the following for abnormal indication: <ul style="list-style-type: none"> <li>○ CCW surge tank level</li> <li>○ Letdown flow rate</li> <li>○ Charging flow rate</li> <li>○ Thermal barrier Delta P</li> <li>○ RCP seal injection flows</li> <li>○ Pressurizer level trend</li> <li>○ RCP thermal barrier return flow (Local)</li> <li>○ WHUT levels</li> </ul>
	BOP	Close AC-FCV-625
	RO	Investigate RCP vibration alarm (ARP-13) (ONOP-RCS-5 also applies but unlikely action will be taken prior to RCP failure)

Op Test No.: 1 Scenario # 4 Event # 6, 7, 8, Page 16 of 29

Event Description: RCP Sheared Shaft; ATWS; Turbine Trip Failure; Boration Failure

Time	Position	Applicant's Actions or Behavior
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Booth Instructor: When RO is checking RCP vibration, insert the following commands:

**FILE RCSFLOW2**

(OVR XMT RCS38 85,40,0)

(OVR XMT RCS39 85,40,0)

(OVR XMT RCS40 85,40,0)

	CREW	Recognize requirement for reactor trip on Low RCS flow
	CRS	Enter E-0, Reactor Trip or Safety Injection. Direct reactor trip.
	RO	Attempt to manually trip reactor.
	BOP	De-energize busses with an energized MG set for at least 5 seconds then re-energize <ul style="list-style-type: none"> <li>o Bus 2A and 6A</li> </ul>
<b>Critical Task</b>	RO	Manually Trip the turbine
	CRS	Go to FR-S.1, Response to Nuclear Power Generation/ATWS
	CRS	Dispatch NPO to trip reactor using posted operator aid
	RO	Verify reactor trip <ul style="list-style-type: none"> <li>o Reactor trip and bypass breakers open</li> <li>o Rod bottom lights lit</li> <li>o Rod position indicators less than 20 steps</li> <li>o Neutron flux decreasing</li> </ul>

Op Test No.: 1 Scenario # 4 Event # 6, 7, 8, Page 17 of 29

Event Description: RCP Sheared Shaft; ATWS; Turbine Trip Failure; Boration Failure

Time	Position	Applicant's Actions or Behavior
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	RO	Manually trip reactor <ul style="list-style-type: none"> <li>○ Insert control rods in manual</li> <li>○ Dispatch NPO to trip reactor using posted operator aid</li> </ul>
<p style="text-align: center;"><b><u>NOTE</u></b></p> <p>If at any time reactor power decreases to less than 5% with a zero or negative startup rate, then go to step 15, page 13</p>		
	RO	Verify turbine trip (Should have been tripped manually)
	BOP	Check Auxiliary Feedwater pumps running <ul style="list-style-type: none"> <li>○ Motor Driven Both running</li> <li>○ Total AFW flow greater than 730 gpm</li> </ul>
	RO/BOP	Initiate Emergency Boration of RCS <ul style="list-style-type: none"> <li>○ Check charging pumps – ANY RUNNING</li> <li>○ Open CH-MOV-333, Emergency Boration valve  <b>(Will NOT open)</b></li> </ul>
<b>Critical Task</b>	RO/BOP	Emergency Borate using one of the following methods in order of preference: <ul style="list-style-type: none"> <li>○ Attachment 1 (Normal boration)</li> <li>○ Attachment 2 (RWST)</li> <li>○ Attachment 3 (Failing air to FCV-110A)</li> </ul> <p><b>Evaluator note: Attachment 1 is included at the end of this scenario guide</b></p>



Op Test No.: 1 Scenario # 4 Event # 6, 7, 8, Page 18 of 29

Event Description: RCP Sheared Shaft; ATWS; Turbine Trip Failure; Boration Failure

Time	Position	Applicant's Actions or Behavior
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	BOP	Verify containment ventilation isolation <ul style="list-style-type: none"> <li>○ Check Purge valves closed</li> <li>○ Check pressure relief valves closed</li> <li>○ Check WCCPP low pressure zone alarms NOT lit</li> </ul>
	RO	Check SI actuated <ul style="list-style-type: none"> <li>○ If required, then actuate SI (NO)</li> </ul>
	RO	Determine if the following trips have occurred: <ul style="list-style-type: none"> <li>○ Reactor trip</li> <li>○ Turbine trip</li> </ul>
	RO/BOP	Check SG NR levels – ANY greater than 9% <ul style="list-style-type: none"> <li>○ Verify AFW flow greater than 730 gpm until SG NR level is greater than 9%</li> </ul>
	RO	Verify all dilution paths isolated <ul style="list-style-type: none"> <li>○ FCV-111A closed</li> <li>○ CH-330, Boric acid blender primary water bypass isolation closed</li> </ul>

Op Test No.: 1 Scenario # 4 Event # 6, 7, 8, Page 19 of 29

Event Description: RCP Sheared Shaft; ATWS; Turbine Trip Failure; Boration Failure

Time	Position	Applicant's Actions or Behavior
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	RO/BOP	<p>Check for uncontrolled reactivity insertion from uncontrolled RCS cooldown</p> <ul style="list-style-type: none"> <li>○ RCS temperatures decreasing in an uncontrolled manner</li> <li>○ Any SG pressure decreasing in an uncontrolled manner <ul style="list-style-type: none"> <li>○ STOP any CONTROLLED Cooldown</li> </ul> </li> </ul>
<p><i>Booth Instructor:</i>  Delete RTB malfunctions and report as NPO that reactor trip breakers are open  <b>MAL RPS2A CLR</b>  <b>MAL RPS2B CLR</b></p>		
	RO	Check CETs less than 1200°F
	RO	<p>Verify reactor subcritical</p> <ul style="list-style-type: none"> <li>○ Power range less than 5%</li> <li>○ Intermediate range SUR zero or negative</li> </ul>
	RO	Check all rods less than 20 steps
	RO	<p>Secure any emergency boration in progress</p> <ul style="list-style-type: none"> <li>○ Turn makeup control switch to stop</li> <li>○ Establish Auto makeup per SOP-CVCS-3</li> </ul>
	RO	Place both boric acid transfer pumps to slow speed
	RO	Open BAST recirc control valves to approximately 25% open

Op Test No.: 1 Scenario # 4 Event # 6, 7, 8, Page 20 of 29

Event Description: RCP Sheared Shaft; ATWS; Turbine Trip Failure; Boration Failure

Time	Position	Applicant's Actions or Behavior
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	RO/BOP	Check RCP seal cooling <ul style="list-style-type: none"> <li>Seal Injection established</li> <li>Thermal Barrier Cooling established</li> </ul>
	RO	Check charging pump status <ul style="list-style-type: none"> <li>CCW available</li> <li>Any charging pump running</li> <li>Control speed to maintain 6-12 gpm seal injection</li> </ul>
	CREW	Verify adequate Shutdown Margin <ul style="list-style-type: none"> <li>Verify all control rods less than 20 steps</li> <li>Direct watch chemist to sample RCS</li> <li>Check boron concentration greater than required for cold shutdown               <ul style="list-style-type: none"> <li>Refer to graph 4A, 4B</li> </ul> </li> </ul>
	CRS	Return to E-0
	RO	Verify reactor trip <ul style="list-style-type: none"> <li>Reactor trip and Bypass breakers open</li> <li>Rod bottom lights lit</li> <li>Rod position indication less than 20 steps</li> <li>Neutron flux decreasing</li> </ul>
	RO	Verify turbine trip <ul style="list-style-type: none"> <li>All turbine stop valves closed</li> </ul>

Op Test No.: 1 Scenario # 4 Event # 6, 7, 8, Page 21 of 29

Event Description: RCP Sheared Shaft; ATWS; Turbine Trip Failure; Boration Failure

Time	Position	Applicant's Actions or Behavior
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	BOP	Verify all 480V AC Busses energized by offsite power
	RO	Determine if SI is actuated <ul style="list-style-type: none"> <li>Any SI annunciator lit</li> <li>OR</li> <li>SI pumps – ANY RUNNING</li> </ul>
	RO	Determine if SI required using posted operator aid <ul style="list-style-type: none"> <li>Determines SI NOT required</li> </ul>
	BOP	Start Both Motor Driven ABFPs <ul style="list-style-type: none"> <li>Starts 31 and 32 ABFP manually</li> </ul>
	CRS	Direct transition to ES-0.1, Reactor Trip Response
<b><i>Terminate scenario upon transition to ES-0.1</i></b>		

Op Test No.: 1 Scenario # All Event # Attachment 1 Page 22 of 29

Event Description: RO-1, BOP Operator Actions During EOPs

Time	Position	Applicant's Actions or Behavior
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	BOP	<p>Monitor Control Room Annunciators:</p> <ol style="list-style-type: none"> <li>Acknowledge all Supervisory Panel Alarms as time permits</li> <li>Report all unusual alarms affecting accident response to CRS</li> <li>Monitor status of the following alarms: <ul style="list-style-type: none"> <li>HIGH CONT ATMOS TEMP/RTD FAILURE – CLEAR</li> <li>480 V SAFEGUARDS UNDERVOLTAGE – CLEAR</li> </ul> </li> </ol>
<p style="text-align: center;"><b><u>Caution</u></b></p> <p><b>Starting of equipment must be coordinated with the CRS to ensure that two components are <u>not</u> started at the same time on the same power supply.</b></p>		
	BOP	<p>Verify SI Pumps – RUNNING</p> <ol style="list-style-type: none"> <li>THREE SI pumps</li> <li>TWO RHR pumps</li> </ol>
	BOP	<p>Verify Containment FCU status:</p> <ol style="list-style-type: none"> <li>Check FCUs – ALL RUNNING</li> <li>Place FCU Damper control switch in – INCIDENT MODE position</li> <li>Check FCU dampers for all FCUs – IN INCIDENT MODE POSITION <ul style="list-style-type: none"> <li>Dampers A/B – CLOSED (inlet)</li> <li>Damper C – CLOSED (bypass)</li> <li>Damper D – OPEN (outlet)</li> </ul> </li> <li>Place control switches for 1104 and 1105 to OPEN</li> <li>Check Service Water Cooling Valves – OPEN <ul style="list-style-type: none"> <li>1104</li> <li>1105</li> </ul> </li> </ol>
	BOP	Verify SI Valve alignment – Proper Emergency Alignment

Op Test No.: 1 Scenario # All Event # Attachment 1 Page 23 of 29

Event Description: RO-1, BOP Operator Actions During EOPs

Time	Position	Applicant's Actions or Behavior
		<ul style="list-style-type: none"> <li>a. Verify Safeguard Valve Off Normal Position alarm on panel SBF-1 – CLEAR</li> <li>b. Ensure BIT Discharge valves 1835A, 1835B – OPEN</li> <li>c. Ensure BIT Inlet valves 1852A, 1852B – OPEN</li> <li>d. Ensure High Head Stop valves 856J, 856H, 856C, 856E – OPEN</li> <li>e. If RWST purification loop in service, then secure system per SOP-SI-3</li> </ul>
	BOP	Verify ABFP status: <ul style="list-style-type: none"> <li>a. Check Motor Driven Pumps – BOTH RUNNING</li> <li>b. Check Turbine Driven Pump – RUNNING</li> </ul>
	BOP	Verify ABFP valve alignment: <ul style="list-style-type: none"> <li>a. If Motor Driven AFW pump(s) are running, ensure SG Aux FW Reg valve controllers – Set to 0% (full open)               <ul style="list-style-type: none"> <li>• FCV-406A</li> <li>• FCV-406B</li> <li>• FCV-406C</li> <li>• FCV-406D</li> </ul> </li> <li>b. Check SG Blowdown Isolation Valves - CLOSED</li> </ul>

Op Test No.: 1 Scenario # All Event # Attachment 1 Page 24 of 29

Event Description: RO-1, BOP Operator Actions During EOPs

Time	Position	Applicant's Actions or Behavior
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	BOP	Verify CCW Pump status: <ul style="list-style-type: none"> <li>a. Check CCW pumps – ALL RUNNING</li> <li>b. Check RHR HX CCW Shutoff valve – OPEN</li> </ul>
	BOP	Verify Essential Service Water Pumps – Three Running
	BOP	Verify Containment Isolation Phase A: <ul style="list-style-type: none"> <li>a. Check Phase A – ACTUATED</li> <li>b. Check Phase A valves – CLOSED               <ul style="list-style-type: none"> <li>• Refer to Attachment 2, Phase A valve closure list</li> </ul> </li> </ul>
	BOP	Verify Containment Ventilation Isolation: <ul style="list-style-type: none"> <li>a. Check Purge Valves – CLOSED               <ul style="list-style-type: none"> <li>• FCV-1170</li> <li>• FCV-1171</li> <li>• FCV-1172</li> <li>• FCV-1173</li> </ul> </li> <li>b. Check Pressure Relief valves – CLOSED               <ul style="list-style-type: none"> <li>• PCV-1190</li> <li>• PCV-1191</li> <li>• PCV-1192</li> </ul> </li> <li>c. Check WCCPP low pressure zone alarm – NOT LIT</li> <li>d. Verify IVSW Valves – OPEN               <ul style="list-style-type: none"> <li>• IV-AOV-1410</li> <li>• IV-AOV-1413</li> <li>• IV-SOV-6200</li> <li>• IV-SOV-6201</li> </ul> </li> </ul>
	BOP	Verify Emergency Diesel Generator status:

Op Test No.: 1 Scenario # All Event # Attachment 1 Page 25 of 29

Event Description: RO-1, BOP Operator Actions During EOPs

Time	Position	Applicant's Actions or Behavior
		<ul style="list-style-type: none"> <li>a. Check EDGs – ALL RUNNING</li> <li>b. Check Both EDG SWS Outlet Flow Control Valves – OPEN <ul style="list-style-type: none"> <li>• SWN-FCV-1176</li> <li>• SWN-FCV-1176A</li> </ul> </li> <li>c. Dispatch NPO to set switches for both EDG SWS Outlet Flow Control Valves to OPEN: <ul style="list-style-type: none"> <li>• SWN-FCV-1176</li> <li>• SWN-FCV-1176A</li> </ul> </li> </ul>
	BOP	<p>Verify Control Room Ventilation:</p> <ul style="list-style-type: none"> <li>a. SET Control Room ventilation control switch to – 10% INCIDENT MODE (switch position 3)</li> <li>b. Check Damper status Dampers A, B, F1, F2 <ul style="list-style-type: none"> <li>• A – DIM</li> <li>• B – BRIGHT</li> <li>• Either F1 OR F2 – BRIGHT</li> </ul> </li> <li>c. Verify AC Compressors and fans – ALL RUNNING <ul style="list-style-type: none"> <li>• ACC 31A ON – BRIGHT</li> <li>• ACC 31B ON – BRIGHT</li> <li>• ACC 32A ON – BRIGHT</li> <li>• ACC 32B ON – BRIGHT</li> <li>• ACF 31 ON – BRIGHT</li> <li>• ACF 32 ON – BRIGHT</li> </ul> </li> </ul>



Op Test No.: 1 Scenario # All Event # Attachment 1 Page 26 of 29

Event Description: RO-1, BOP Operator Actions During EOPs

Time	Position	Applicant's Actions or Behavior
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	BOP	<p>Verify Emergency DC Oil Pumps status:</p> <ul style="list-style-type: none"> <li>• Main turbine emergency bearing oil pump – RUNNING</li> <li>• Dispatch NPO to verify main generator air side seal oil backup pump – RUNNING</li> <li>• MBFP DC emergency oil pump – RUNNING</li> </ul>
	BOP	<p>Reset SI as follows:</p> <ol style="list-style-type: none"> <li>Press BOTH SI RESET pushbuttons on Panel SBF-2: <ul style="list-style-type: none"> <li>• Train 1 SI Reset</li> <li>• Train 2 SI Reset</li> </ul> </li> <li>Check SI – RESET <ul style="list-style-type: none"> <li>• SI ACTUATED light – EXTINGUISHED</li> </ul> </li> </ol>
	BOP	<p>Reset MCCs as follows:</p> <ol style="list-style-type: none"> <li>Dispatch NPO to secure VC sump pumps and RCDT pumps on Waste Disposal panel</li> <li>Dispatch NPO to align and reset MCCs per SOP-EL-15</li> </ol>
<p><b>Note to examiner:</b>  The following step is designed to stop actions of RO-1 IF the CRS has transitioned to ES-1.1. The BOP will continue in RO-1 if there is transition to other procedures, but any time ES-1.1 is entered, the BOP will inform the CRS of automatic action verification and RO-1 will be suspended.</p>		

Op Test No.: 1 Scenario # All Event # Attachment 1 Page 27 of 29

Event Description: RO-1, BOP Operator Actions During EOPs

Time	Position	Applicant's Actions or Behavior
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	BOP	<p>Check if additional SI actions should be performed:</p> <ol style="list-style-type: none"> <li>Check if the CRS has transitioned to – ES-1.1</li> <li>Perform the following: <ul style="list-style-type: none"> <li>Inform the CRS of the status of automatic action verification</li> <li>If E-0 has been exited, THEN continue with step 17</li> <li>If E-0 has NOT been exited, then wait until E-0 is exited. When E-0 is exited, then recheck this step</li> </ul> </li> </ol>
	BOP	<p>Perform the following:</p> <ol style="list-style-type: none"> <li>Dispatch NPO to perform the following: <ul style="list-style-type: none"> <li>Close SWN-FCV-1111 and SWN-FCV-1112</li> </ul> </li> <li>Check Condensate Pumps – ONLY ONE RUNNING.</li> <li>SECURE all but one Condensate Pump</li> <li>Initiate the following section of SOP-EL-15 <ul style="list-style-type: none"> <li>Alignment of City water Cooling</li> </ul> </li> </ol>
	BOP	<p>Reset Containment isolation Phase A and Phase B as follows:</p> <ol style="list-style-type: none"> <li>PLACE switches for letdown orifice isolation valves to CLOSE: <ul style="list-style-type: none"> <li>200A</li> <li>200B</li> <li>200C</li> </ul> </li> <li>RESET Phase A</li> <li>RESET Phase B, if actuated</li> </ol>

Op Test No.:	<u>1</u>	Scenario #	<u>All</u>	Event #	<u>Attachment 1</u>	Page	<u>28</u>	of	<u>29</u>
Event Description: RO-1, BOP Operator Actions During EOPs									
Time	Position	Applicant's Actions or Behavior							

	BOP	<p>Establish Instrument Air and Nitrogen to containment:</p> <ol style="list-style-type: none"> <li>Establish IA to containment: <ul style="list-style-type: none"> <li>Check INST AIR LOW PRESS alarm on panel SJF – CLEAR</li> <li>DEPRESS Inst Air reset pushbutton 28</li> <li>CHECK IA-PCV-1228, Inst Air to Cont. – OPEN</li> </ul> </li> <li>ESTABLISH PRZR PORV N2 supply: <ul style="list-style-type: none"> <li>PRESS Accumulator N2 Supply Reset pushbutton 44</li> <li>Check 863, Accumulator N2 Supply Valve – OPEN</li> </ul> </li> </ol>
	BOP	<p>Check if one non-essential Service Water pump should be started:</p> <ol style="list-style-type: none"> <li>Check Off-Site power to at least one Non-Essential service Water Pump – AVAILABLE</li> <li>Check SWN-FCV-1111 and SWN-FCV-1112 – CLOSED</li> <li>START one Non-Essential Service Water pump</li> </ol>
	BOP	<p>Check status of off-site power:</p> <ol style="list-style-type: none"> <li>VERIFY all AC Busses: <ul style="list-style-type: none"> <li>Energized by off-site power</li> <li>AND</li> <li>All 480V tie breakers open</li> </ul> </li> </ol>

Op Test No.: 1 Scenario # All Event # Attachment 1 Page 29 of 29

Event Description: RO-1, BOP Operator Actions During EOPs

Time	Position	Applicant's Actions or Behavior
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**NOTE**

**It is permissible for operators to perform board clean-up actions (steps 22-29 of RO1, BOP OPERATOR ACTIONS DURING USE OF EOPs) while performing actions of other EOPs; provided this does not interfere with other EOPs in progress.**

**EVALUATOR NOTE: The remainder of the steps in this attachment are highlighted (High Level) action only.**

	BOP	Re-align secondary plant
	BOP	Check secondary valve position
	BOP	Check Heater Drain Pumps 31 and 32 Tripped
	BOP	Check plant equipment status
	BOP	Determine if Source Range detectors should be energized
	BOP	Start AC Oil Pumps and Stop DC Oil pumps as follows
	BOP	Check Long Term Plant status
	BOP	Inform CRS that RO-1 is complete and advise on the status of actions

Facility:	IP3	Scenario No.:	5	Op Test No.:	1
Examiners:	_____	Candidates:	_____	CRS	
	_____		_____	RO	
	_____		_____	PO	
 <u>Initial Conditions:</u> 9% power BOL					
Plant startup in progress					
<u>Turnover:</u> Raise power and synchronize the Main Generator					
<u>Critical Tasks:</u> Place ECCS equipment in PTL					
Isolate ruptured SG					

  

Event No.	Malf. No.	Event Type*	Event Description
1		R (RO) N (BOP) N (CRS)	Raise reactor power. Synchronize Main Generator
2	RCS20B	I (ALL)	Tcold instrument fails high
3	SGN5C	C (ALL)	Steam Generator Tube Leak
4	SGN5C	M (ALL)	SGTR
5	XMT SGN10	C (RO)	Atmospheric Dump valve on ruptured SG fails open
6	RPS6B	C (BOP)	Train 'B' RTB fails closed. Manual action to reset SI prior to stopping ECCS pumps

\* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

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## Scenario Event Description

### NRC Scenario 5

---

The crew will assume the shift to raise power and synchronize the Main Generator to the grid IAW POP-1.3 and SOP-TG-4.

When the generator is on-line, a Tcold instrument will fail high. IAW ONOP-RPC-1, the RO will place the running Charging Pump in manual, the BOP will trip bistables, and the CRS will refer to Technical Specifications.

When the plant is stable, a steam generator tube leak will develop, requiring action IAW ONOP-SG-1. Leak rate will be quantified, secondary systems will be isolated, and the crew will begin a plant shutdown IAW POP-3.1.

While the crew is shutting the plant down, the tube leak will increase in severity. The crew will determine that pressurizer level cannot be maintained, and a reactor trip will be required.

When the reactor trips, one Atmospheric Dump Valve will fail open, requiring manual action to close it to minimize radioactive release to atmosphere. Additionally, the 'B' RTB will stick closed. Manual action will be required to reset safeguards actuation pin relays prior to stopping ECCS equipment to terminate the event.

EOP flow path: E-0 – E-3 - ES-3.1

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## Scenario Event Description

### NRC Scenario 5

---

The crew will assume the shift to raise power and synchronize the Main Generator to the grid IAW POP-1.3 and SOP-TG-4.

When the generator is on-line, a Tcold instrument will fail high. IAW ONOP-RPC-1, the RO will place the running Charging Pump in manual, the BOP will trip bistables, and the CRS will refer to Technical Specifications.

When the plant is stable, a steam generator tube leak will develop, requiring action IAW ONOP-SG-1. Leak rate will be quantified, secondary systems will be isolated, and the crew will begin a plant shutdown IAW POP-2.1.

While the crew is shutting the plant down, the tube leak will increase in severity. The crew will determine that pressurizer level cannot be maintained, and a reactor trip will be required.

When the reactor trips, one Atmospheric Dump Valve will fail open, requiring manual action to close it to minimize radioactive release to atmosphere. Additionally, the 'B' RTB will stick closed. Manual action will be required to reset safeguards actuation pin relays prior to stopping ECCS equipment to terminate the event.

EOP flow path: E-0 – E-3 - ES-3.1

Indian Point Unit 3  
2003 NRC Initial License Examination  
Simulator Scenario Setup  
Scenario 5

**RESET TO IC-40**

No equipment OOS

Train B reactor trip breaker failure: MAL RPS6B ACT

<u>Override Feed Heater Hi Level annunciators:</u>	OVR ANN FWH1 2
	OVR ANN FWH4 2
	OVR IND FWH33 50
	OVR IND FWH34 50
	OVR IND FWH35 50

Materials needed for scenario:

- POP-1.3 signed off up to step 4.35
- SOP-TG-4 signed off up to step 4.2.16
- Graph Book
- OA-99-29 (Operator Aid)
- Daily Reactivity Sheet

Allow crew to begin scenario brief approximately 30 minutes prior to entering simulator

Note: None

Scenario built from IC 8



Indian Point Unit 3  
2003 NRC Initial License Examination  
Simulator Scenario Turnover Information  
Scenario 5

- The plant is at 8% power in preparation for generator synchronization
- Beginning of Life,  $C_b$  is 1580 ppm.
- Burnup = 150 MWD/MTU
- Control Bank D = 105 steps
- Rod Control in Manual
- $T_{avg}$  = 550°F
- RCS Pressure = 2235 psig
- 31 MBFP in manual, 32 MBFP in standby
- Low Flow Bypass FRVs in service

The following equipment is out of service:

None

Crew instructions:

- In accordance with POP-1.3, step 4.35, and SOP-TG-4, step 4.2.16, synchronize the Main Generator and commence power increase not to exceed 10% per hour.

Op Test No.: 1 Scenario # 5 Event # 1 Page 5 of 29

Event Description: Raise reactor power. Synchronize Main Generator.

Time	Position	Applicant's Actions or Behavior
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	CRS	Refers to POP-1.3, step 4.35, Perform excitation and synchronization of Turbine Generator per SOP-TG-4, Turbine Generator Operation
	CRS	Refers to SOP-TG-4, step 4.2.16
	BOP	When synchroscope indicates approximately 2 minutes before 12 o'clock, then close the selected generator output breaker
	BOP	Adjust governor speed changer to obtain 10 to 20 MWe generator load
	BOP	Place synchroscope switch in OFF
	BOP	Check H2 cooler gas outlet temperatures within 2.0°C of each other
	BOP	Ensure all stator RTD $\Delta T$ s are within limits
	BOP	Adjust governor speed changer to obtain 20 to 40 MWe generator load and perform the following: <ul style="list-style-type: none"> <li>○ Maintain load 20 to 40 MWe until 6.9 KV busses are transferred</li> <li>○ Verify Unit Aux Transformer tap changer hangup alarm clears (SHF)</li> </ul>

Op Test No.: 1 Scenario # 5 Event # 1 Page 6 of 29

Event Description: Raise reactor power. Synchronize Main Generator.

Time	Position	Applicant's Actions or Behavior
	BOP	Ensure generator megavar meter indicates zero or slightly to the right by adjusting regulator voltage adjuster until proper indication is obtained
	BOP	Adjust regulator base adjuster to maintain voltage regulator DC Milliammeter nulled
	CRS	Notify Coned S.O that generator output breaker is closed
	CRS	Contact Coned D.O and request permission to close other 345 KV breaker
	BOP	When permission obtained to close the other generator breaker, then perform the following: <ul style="list-style-type: none"> <li>o Place potential selector switch in position for breaker to be closed</li> <li>o Place synchroscope in MAN</li> <li>o Verify synchroscope is at 12 o'clock</li> <li>o Close second breaker</li> <li>o Place synchroscope in OFF</li> <li>o Place Potential Selector switch in OFF</li> </ul>
	BOP	Ensure turbine aux oil pump is stopped and in AUTO
	BOP	Ensure bearing oil pump is stopped and in AUTO
		<b><i>Return to POP-1.3</i></b>

Op Test No.:	<u>1</u>	Scenario #	<u>5</u>	Event #	<u>1</u>	Page	<u>7</u>	of	<u>29</u>
Event Description: Raise reactor power. Synchronize Main Generator.									
Time	Position	Applicant's Actions or Behavior							

	CRS	When power above P-10 illuminates, then block NIS Rod Stop and trips
	BOP	Transfer loads on 6.9 KV busses 1 – 4 to UAT per SOP-EL-5, Operation of Onsite power sources
<b><i>When busses 1-4 are transferred, proceed to Event 2</i></b>		

Op Test No.: 1 Scenario # 5 Event # 2 Page 8 of 29

Event Description: Tcold Instrument Fails High

Time	Position	Applicant's Actions or Behavior
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*Booth Instructor: When directed, insert the following command:*  
**MAL RCS20B ACT,645,0,0**

	CRS	Refers to ONOP-RPC-1, Instrument Failures
	CREW	Verify the following controls: <ul style="list-style-type: none"> <li>○ Turbine load – STABLE</li> <li>○ Rod Control – STABLE</li> <li>○ PRZR pressure control – NORMAL</li> <li>○ PRZR level control – NORMAL</li> <li>○ MBFP Speed – NORMAL</li> <li>○ SG levels – NORMAL               <ul style="list-style-type: none"> <li>○ May take manual control of charging flow</li> </ul> </li> </ul>
<p style="text-align: center;"><b><u>NOTE</u></b></p> <ul style="list-style-type: none"> <li>○ Positive reactivity additions using control rods require CRS or SM approval and shall be made slowly and incrementally</li> <li>○ Substeps of step 2 may be performed in any order</li> <li>○ If a bistable failure is suspected with no other indications, then entry into the appropriate attachment is permitted</li> </ul>		
	RO	Check the following instrumentation: <ul style="list-style-type: none"> <li>○ RCS loop temperatures normal <b>(NO) Loop 2 High</b></li> <li>○ Check <math>\Delta T</math> setpoints               <ul style="list-style-type: none"> <li>○ Power Range channels</li> <li>○ Overpower <math>\Delta T</math></li> <li>○ Overtemperature <math>\Delta T</math></li> </ul> </li> <li>○ RCS coolant loop flow channels</li> <li>○ PRZR instrumentation</li> </ul>

Op Test No.: 1 Scenario # 5 Event # 2 Page 9 of 29

Event Description: Tcold Instrument Fails High

Time	Position	Applicant's Actions or Behavior
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	CRS	Determine appropriate attachment for RCS Hot and Cold Leg RTD failures: <ul style="list-style-type: none"><li>○ Temperature high, Delta T low, go to Attachment 1</li></ul>
	RO/BOP	Performs attachment 1 <b>(Evaluator note: Attachment 1 procedure is attached to the end of this scenario guide)</b>
<b><i>When attachment 1 is complete or at Lead Evaluator's discretion, proceed to Event 3</i></b>		

Op Test No.: 1 Scenario # 5 Event # 3 Page 10 of 29

Event Description: Steam Generator Tube Leak

Time	Position	Applicant's Actions or Behavior
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*Booth Instructor: When directed, insert the following command:*  
**MAL SGN5C ACT,0.05,0,0**

	CRS	Refers to ONOP-SG-1, SG Tube Leak
	RO	Check pressurizer level can be maintained greater than 5% and stable or increasing
	RO	Monitor VCT level <ul style="list-style-type: none"> <li>o Maintain VCT level greater than 22% with makeup in auto or manual per SOP-CVCS-3</li> </ul>

**NOTE**

- o For direction on the classification of events, refer to initiating conditions and emergency action levels in VOL II of the Emergency Plan
- o Blowdown sample lines may be unisolated for sampling purposes
- o If R-15 is NOT in service, then R-15 should be restored to operable as soon as possible
- o The leaking SG may be identified by:
  - o Positive chemistry sample
  - o R-62 radiation monitor
  - o HP surveys
  - o Unexplained increase in SG level

	CREW	Identify leaking SG <ul style="list-style-type: none"> <li>o 33 SG is leaking</li> </ul>

**NOTE**

Shutdown due to exceeding Tech Spec limits requires a four hour NRC notification

Op Test No.:	<u>1</u>	Scenario #	<u>5</u>	Event #	<u>3</u>	Page	<u>11</u>	of	<u>29</u>
Event Description: Steam Generator Tube Leak									
Time	Position	Applicant's Actions or Behavior							

	CREW	Monitor leakage – IN EXCESS OF TECH SPECS
	CRS	Determine Emergency classification
	CRS	Refer to Emergency Response Activation, Volume II <ul style="list-style-type: none"> <li>Be in Mode 3 in next 2 hours</li> </ul>
	CREW	Initiate Attachment 2, Monitoring Frequency (Evaluator note: Attachment provided at end of scenario guide)
<p style="text-align: center;"><b>NOTE</b></p> <ul style="list-style-type: none"> <li>Chemistry sample is considered the most reliable leakrate and does not require validation</li> <li>Validation only requires supporting indication of an actual tube leak, NOT the magnitude of the leak</li> <li>If validation of the calculated leak rate cannot be performed within 15 minutes of initial leakrate quantification then the most recent calculated reading shall be considered valid</li> <li>Plant shutdown and cooldown procedures should be reviewed as time permits</li> </ul>		
	CRS	Check sample results – OBTAINED
<i>Booth Instructor note: Approximately 15 minutes after Chemistry sample request, report leakage at 80 GPD in 33 SG</i>		
	CRS	Check primary to secondary leakage – LESS THAN 75 gpd <ul style="list-style-type: none"> <li>Be in Mode 3 within 2 hours</li> </ul>



Op Test No.: 1 Scenario # 5 Event # 3 Page 12 of 29

Event Description: Steam Generator Tube Leak

Time	Position	Applicant's Actions or Behavior
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	CRS	Initiate attachment 1, Isolation of Secondary side
	BOP	Performs attachment 1 (Evaluator note: Attachment provided at end of scenario guide)
	CRS	Check leakrate in any steam generator greater than 75 GPD
	CRS	Check reactor in Mode 1 or 2
	CRS	Initiate a Plant Shutdown
<b>When decision is made to shut down after attachment 1 is commenced, proceed to Event 4</b>		

Op Test No.:	<u>1</u>	Scenario #	<u>5</u>	Event #	<u>4, 5, 6</u>	Page	<u>13</u> of <u>29</u>
Event Description:		SGTR, Atmospheric Dump Valve on ruptured SG fails open; Train "B" RTB fails closed. Manual action to stop ECCS pumps.					
Time	Position	Applicant's Actions or Behavior					

*Booth Instructor: When directed, insert the following command:*

**MAL SGN5C ACT,10,60,0**

**OVR XMT SGN10 1400,60,0**

	CRS	Based upon increase in RCS leakrate, decide to trip reactor and enter E-0
	CRS	Go to E-0, Reactor Trip or Safety Injection
	RO	Verify reactor trip: <ul style="list-style-type: none"> <li>○ Reactor trip and bypass breakers open ('B' RTB Closed)</li> <li>○ Rod bottom lights lit</li> <li>○ Rod position indicators less than 20 steps</li> <li>○ Neutron flux decreasing               <ul style="list-style-type: none"> <li>○ Direct NPO to open RTB 'B'</li> </ul> </li> </ul>
	RO	Verify Turbine Trip: <ul style="list-style-type: none"> <li>○ Verify all turbine stop valves closed</li> </ul>
	BOP	Verify 480V AC Busses – All energized by offsite power
	Crew	Determine if SI is actuated <ul style="list-style-type: none"> <li>○ Any SI annunciator lit</li> <li>OR</li> <li>○ SI pumps – ANY RUNNING (YES)</li> </ul>

Op Test No.:	<u>1</u>	Scenario #	<u>5</u>	Event #	<u>4, 5, 6</u>	Page	<u>14</u> of <u>29</u>
Event Description:		SGTR, Atmospheric Dump Valve on ruptured SG fails open; Train "B" RTB fails closed. Manual action to stop ECCS pumps.					
Time	Position	Applicant's Actions or Behavior					

	BOP	<p>Check AFW status:</p> <ul style="list-style-type: none"> <li>○ Verify total AFW flow – greater than 365 gpm</li> <li>○ Control feed flow to maintain SG NR levels between 9%(14%) and 50% <ul style="list-style-type: none"> <li>○ May stop feed to 33 SG based on SG level</li> </ul> </li> </ul>
<p style="text-align: center;"><b>CAUTION</b></p> <p>Starting of equipment must be coordinated with all control room operators to ensure that two components are NOT started at the same time on the same power supply</p>		
	CRS	Direct BOP operator to perform RO-1, BOP operator actions during use of EOPs (steps begin on page 22 of this guide)
	RO	<p>Verify Feedwater Isolation:</p> <ul style="list-style-type: none"> <li>○ Verify MBFPs tripped</li> <li>○ Verify MBFP discharge valves closed <ul style="list-style-type: none"> <li>○ BFD-MOV-2-31</li> <li>○ BFD-MOV-2-32</li> </ul> </li> <li>○ Verify Main and Bypass feedwater isolated <ul style="list-style-type: none"> <li>○ Main and Bypass FW MOVs closed</li> <li>OR</li> <li>○ Main (SNF panel) and Bypass FW FRVs closed</li> </ul> </li> </ul>
<p><i>Booth Instructor: Approximately 5 minutes after call to open 'B' Reactor Trip Breaker, report that it will NOT open</i></p>		
	RO	<p>Check SG Blowdown:</p> <ul style="list-style-type: none"> <li>○ SG Blowdown isolation valves closed</li> <li>○ SG Sample isolation valves closed</li> </ul>

Op Test No.:	<u>1</u>	Scenario #	<u>5</u>	Event #	<u>4, 5, 6</u>	Page	<u>15</u> of <u>29</u>
Event Description:		SGTR, Atmospheric Dump Valve on ruptured SG fails open; Train "B" RTB fails closed. Manual action to stop ECCS pumps.					
Time	Position	Applicant's Actions or Behavior					

	RO	Verify SI flow: <ul style="list-style-type: none"> <li>Check RCS pressure less than 1650 psig (2000 psig)(NO)</li> </ul>
	RO	Verify Containment Spray NOT required: <ul style="list-style-type: none"> <li>Check containment pressure has remained less than 22 psig</li> </ul>
	RO	Check RCP seal cooling: <ul style="list-style-type: none"> <li>Verify CCW flow to RCP thermal barriers               <ul style="list-style-type: none"> <li>RCP BEARING COOLANT LOW FLOW alarm on panel SGF clear</li> <li>THERMAL BARRIER CCW HEADER LOW FLOW alarm on panel SGF clear</li> </ul> </li> </ul>
Critical task (Isolation action)	RO	Check RCS average temperature stable at or trending to 547°F <ul style="list-style-type: none"> <li>STOP Dumping steam               <ul style="list-style-type: none"> <li><b>33 SG Atmospheric in MANUAL and CLOSE</b></li> </ul> </li> <li>Additional cooldown actions</li> </ul>
	RO	Check if RCPs should be stopped <ul style="list-style-type: none"> <li>HHSI pumps – AT LEAST 1 RUNNING</li> <li>RCS Subcooling – LESS THAN REQUIRED (NO)</li> </ul>
	RO	Check PRZR PORVs, Safety Valves, and Spray Valves <ul style="list-style-type: none"> <li>Check both PRZR PORVs – CLOSED</li> <li>Check PRZR Safety Valves – CLOSED               <ul style="list-style-type: none"> <li>Tailpipe temperatures normal</li> <li>Acoustic monitors normal</li> </ul> </li> <li>Check normal PRZR Spray Valves closed</li> <li>Check CH-AOV-212 closed</li> </ul>

Op Test No.: 1 Scenario # 5 Event # 4, 5, 6 Page 16 of 29

Event Description: SGTR, Atmospheric Dump Valve on ruptured SG fails open; Train "B" RTB fails closed. Manual action to stop ECCS pumps.

Time	Position	Applicant's Actions or Behavior
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	RO	Determine if SGs are faulted: <ul style="list-style-type: none"> <li>Check SG pressures:               <ul style="list-style-type: none"> <li>ANY DECREASING IN AN UNCONTROLLED MANNER (NO)</li> </ul> </li> </ul>
	CREW	Determine if SG tubes are ruptured: <ul style="list-style-type: none"> <li>Condenser Air ejector radiation recorder trends – NORMAL</li> <li>SG Blowdown Radiation recorder trends – NORMAL</li> <li>Main Steam Line radiation recorder trends – NORMAL</li> <li>All intact SG level response – NORMAL</li> </ul> (NO)
	CRS	Direct transition to E-3, Steam Generator Tube Rupture
	RO	Determine if RCPs should be stopped (NO)
	RO	Identify Ruptured SG <ul style="list-style-type: none"> <li>33 SG identified</li> </ul>
<p style="text-align: center;"><b><u>CAUTION</u></b></p> <ul style="list-style-type: none"> <li>If the turbine driven AFW pump is the only available source of feed flow, steam supply to the turbine driven AFW pump should be maintained from at least 1 SG</li> <li>At least 1 SG must be maintained available for RCS cooldown</li> </ul>		

Event Description: SGTR, Atmospheric Dump Valve on ruptured SG fails open; Train "B" RTB fails closed. Manual action to stop ECCS pumps.

Time	Position	Applicant's Actions or Behavior
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CT (Isolation action)	RO	Isolate flow from ruptured SG <ul style="list-style-type: none"> <li>○ Adjust atmospheric controller to 1040 psig</li> <li>○ Check ruptured atmospheric closed <ul style="list-style-type: none"> <li>○ Manually close</li> </ul> </li> </ul>
	CREW	Check 32 and 33 SGs intact <ul style="list-style-type: none"> <li>○ Dispatch NPO to close 33 SG steam supply to TD ABFP</li> </ul>
	BOP	Verify BD isolation valves from 33 SG closed
	CRS	Dispatch NPO to locally isolate ruptured SG using posted operator aid
	BOP	Ensure ruptured SG steam line valves closed <ul style="list-style-type: none"> <li>○ MSIV</li> <li>○ MSIV bypass</li> </ul>
	CREW	Ensure ruptured SG isolated from at least one intact SG
<p style="text-align: center;"><b><u>CAUTION</u></b></p> <p>If any ruptured SG is faulted, feed flow to that SG should remain isolated during subsequent recovery actions unless needed for RCS cooldown</p>		
	RO	Check ruptured SG level greater than 9%

Op Test No.:	<u>1</u>	Scenario #	<u>5</u>	Event #	<u>4, 5, 6</u>	Page	<u>18</u> of <u>29</u>
Event Description:		SGTR, Atmospheric Dump Valve on ruptured SG fails open; Train "B" RTB fails closed. Manual action to stop ECCS pumps.					
Time	Position	Applicant's Actions or Behavior					

	RO/BOP	Stop feed flow to 33 SG
<p style="text-align: center;"><b>CAUTION</b></p> <p>If any PRZR PORV opens because of high pressure, step 5.b should be repeated after pressure decreases to less than the PORV setpoint</p>		
	RO	Check PORVs and block valves <ul style="list-style-type: none"> <li>○ Power available to block valves</li> <li>○ PORVs closed</li> <li>○ Any block valves open</li> </ul>
	RO	Check if SGs are faulted <ul style="list-style-type: none"> <li>○ Any SG depressurizing in an uncontrolled manner</li> <li>○ Any SG depressurized</li> </ul>
	RO	Check intact SG levels <ul style="list-style-type: none"> <li>○ Level response in intact SGs normal</li> <li>○ Control feed flow to maintain 9% to 50%</li> </ul>
	BOP	Reset SI <ul style="list-style-type: none"> <li>○ Check RO-1, steps 2-12 completed</li> <li>○ Press both SI reset buttons on panel SBF-2</li> </ul>
	BOP	Check SI reset (NO) (Train B RTB stuck closed) <ul style="list-style-type: none"> <li>○ Use DEFEAT keys and reset pin relays</li> </ul>
	BOP	Reset Containment Isolation Phase A

Op Test No.:	<u>1</u>	Scenario #	<u>5</u>	Event #	<u>4, 5, 6</u>	Page	<u>19</u>	of	<u>29</u>
Event Description:		SGTR, Atmospheric Dump Valve on ruptured SG fails open; Train "B" RTB fails closed. Manual action to stop ECCS pumps.							
Time	Position	Applicant's Actions or Behavior							

	BOP	Establish Instrument Air to Containment
<p style="text-align: center;"><b><u>CAUTION</u></b></p> <p>RCS pressure should be monitored. If RCS pressure decreases in an uncontrolled manner to less than 325 psig (650 psig) then the RHR pumps must be manually restarted to supply water to the RCS</p>		
	BOP	Determine if RHR pumps should be stopped <ul style="list-style-type: none"> <li>Stop RHR pumps and place in AUTO</li> </ul>
<p style="text-align: center;"><b><u>CAUTION</u></b></p> <p>Isolation of the ruptured SG should be completed by closing the MSIV and bypass for the ruptured SG or for the intact SGs before continuing to step 12, unless a ruptured SG is needed for RCS cooldown</p>		
	RO	Check ruptured SG pressure greater than 400 psig
<p style="text-align: center;"><b><u>NOTE</u></b></p> <ul style="list-style-type: none"> <li>RCS cooldown should proceed as quickly as possible and should NOT be limited by the 100°F Tech Spec limit. Integrity limits should NOT be exceeded since the final temperature will remain above 320°F.</li> <li>After an operator-induced cooldown in step 13 is begun, the continuous action for RCP trip criteria no longer applies</li> </ul>		
	RO	Initiate RCS cooldown <ul style="list-style-type: none"> <li>Determine required Core Exit temperature from table</li> </ul>



Op Test No.: 1 Scenario # 5 Event # 4, 5, 6 Page 20 of 29

Event Description: SGTR, Atmospheric Dump Valve on ruptured SG fails open; Train "B" RTB fails closed. Manual action to stop ECCS pumps.

Time	Position	Applicant's Actions or Behavior
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	RO	Dump steam from all intact SGs at maximum rate <ul style="list-style-type: none"> <li>Manually open Atmospherics</li> </ul>
	RO	When RCS temperature is below the required core exit temperature, STOP the cooldown and maintain temperature below the required limit
	RO	Check RCP seal cooling established
	RO	Establish charging flow
<p style="text-align: center;"><b><u>CAUTION</u></b></p> <p>RCS cooldown shall be completed before continuing</p>		
	RO	Check ruptured SG pressure stable or increasing
	RO	Check RCS subcooling greater than 60°F (OR table)
<p style="text-align: center;"><b><u>NOTE</u></b></p> <p>If pressure does not decrease or decreases only slowly then go to step 20 to expedite recovery</p>		
	RO	Depressurize RCS using pressurizer spray to minimize break flow and refill pressurizer

Op Test No.:	<u>1</u>	Scenario #	<u>5</u>	Event #	<u>4, 5, 6</u>	Page	<u>21</u>	of	<u>29</u>
Event Description:		SGTR, Atmospheric Dump Valve on ruptured SG fails open; Train "B" RTB fails closed. Manual action to stop ECCS pumps.							
Time	Position	Applicant's Actions or Behavior							

	RO	Terminate depressurization when RCS pressure is less than SG pressure and pressurizer level is greater than 14% <b>OR</b> When pressurizer level exceeds 71%
	RO	Determine if SI should be terminated: <ul style="list-style-type: none"> <li>○ Check RCS subcooling based on qualified CETs greater than 40°F (OR table)</li> <li>○ Check secondary heat sink               <ul style="list-style-type: none"> <li>○ Total AFW to intact SGs greater than 365 psig available, OR</li> <li>○ Intact SG NR levels – ANY greater than 9% (14%)</li> </ul> </li> <li>○ RCS pressure               <ul style="list-style-type: none"> <li>○ Stable or increasing</li> </ul> </li> <li>○ Pressurizer level greater than 14%</li> </ul>
Critical Task	BOP	Stop HHSI pumps and place in AUTO
<b><i>Terminate scenario any time after ECCS pumps are stopped</i></b>		

Op Test No.:	<u>1</u>	Scenario #	<u>All</u>	Event #	<u>Attachment 1</u>	Page	<u>22</u>	of	<u>29</u>
Event Description:		RO-1, BOP Operator Actions During EOPs							
Time	Position	Applicant's Actions or Behavior							

	BOP	<p>Monitor Control Room Annunciators:</p> <ol style="list-style-type: none"> <li>Acknowledge all Supervisory Panel Alarms as time permits</li> <li>Report all unusual alarms affecting accident response to CRS</li> <li>Monitor status of the following alarms: <ul style="list-style-type: none"> <li>HIGH CONT ATMOS TEMP/RTD FAILURE – CLEAR</li> <li>480 V SAFEGUARDS UNDERVOLTAGE – CLEAR</li> </ul> </li> </ol>
<p style="text-align: center;"><b><u>Caution</u></b></p> <p><b>Starting of equipment must be coordinated with the CRS to ensure that two components are <u>not</u> started at the same time on the same power supply.</b></p>		
	BOP	<p>Verify SI Pumps – RUNNING</p> <ol style="list-style-type: none"> <li>THREE SI pumps</li> <li>TWO RHR pumps</li> </ol>
	BOP	<p>Verify Containment FCU status:</p> <ol style="list-style-type: none"> <li>Check FCUs – ALL RUNNING</li> <li>Place FCU Damper control switch in – INCIDENT MODE position</li> <li>Check FCU dampers for all FCUs – IN INCIDENT MODE POSITION <ul style="list-style-type: none"> <li>Dampers A/B – CLOSED (inlet)</li> <li>Damper C – CLOSED (bypass)</li> <li>Damper D – OPEN (outlet)</li> </ul> </li> <li>Place control switches for 1104 and 1105 to OPEN</li> <li>Check Service Water Cooling Valves – OPEN <ul style="list-style-type: none"> <li>1104</li> <li>1105</li> </ul> </li> </ol>
	BOP	Verify SI Valve alignment – Proper Emergency Alignment

Op Test No.: 1 Scenario # All Event # Attachment 1 Page 23 of 29

Event Description: RO-1, BOP Operator Actions During EOPs

Time	Position	Applicant's Actions or Behavior
		<ul style="list-style-type: none"> <li>a. Verify Safeguard Valve Off Normal Position alarm on panel SBF-1 – CLEAR</li> <li>b. Ensure BIT Discharge valves 1835A, 1835B – OPEN</li> <li>c. Ensure BIT Inlet valves 1852A, 1852B – OPEN</li> <li>d. Ensure High Head Stop valves 856J, 856H, 856C, 856E – OPEN</li> <li>e. If RWST purification loop in service, then secure system per SOP-SI-3</li> </ul>
	BOP	Verify ABFP status: <ul style="list-style-type: none"> <li>a. Check Motor Driven Pumps – BOTH RUNNING</li> <li>b. Check Turbine Driven Pump – RUNNING</li> </ul>
	BOP	Verify ABFP valve alignment: <ul style="list-style-type: none"> <li>a. If Motor Driven AFW pump(s) are running, ensure SG Aux FW Reg valve controllers – Set to 0% (full open)               <ul style="list-style-type: none"> <li>• FCV-406A</li> <li>• FCV-406B</li> <li>• FCV-406C</li> <li>• FCV-406D</li> </ul> </li> <li>b. Check SG Blowdown Isolation Valves - CLOSED</li> </ul>

Op Test No.: 1 Scenario # All Event # Attachment 1 Page 24 of 29

Event Description: RO-1, BOP Operator Actions During EOPs

Time	Position	Applicant's Actions or Behavior
	BOP	Verify CCW Pump status: <ul style="list-style-type: none"> <li>a. Check CCW pumps – ALL RUNNING</li> <li>b. Check RHR HX CCW Shutoff valve – OPEN</li> </ul>
	BOP	Verify Essential Service Water Pumps – Three Running
	BOP	Verify Containment Isolation Phase A: <ul style="list-style-type: none"> <li>a. Check Phase A – ACTUATED</li> <li>b. Check Phase A valves – CLOSED               <ul style="list-style-type: none"> <li>• Refer to Attachment 2, Phase A valve closure list</li> </ul> </li> </ul>
	BOP	Verify Containment Ventilation Isolation: <ul style="list-style-type: none"> <li>a. Check Purge Valves – CLOSED               <ul style="list-style-type: none"> <li>• FCV-1170</li> <li>• FCV-1171</li> <li>• FCV-1172</li> <li>• FCV-1173</li> </ul> </li> <li>b. Check Pressure Relief valves – CLOSED               <ul style="list-style-type: none"> <li>• PCV-1190</li> <li>• PCV-1191</li> <li>• PCV-1192</li> </ul> </li> <li>c. Check WCCPP low pressure zone alarm – NOT LIT</li> <li>d. Verify IVSW Valves – OPEN               <ul style="list-style-type: none"> <li>• IV-AOV-1410</li> <li>• IV-AOV-1413</li> <li>• IV-SOV-6200</li> <li>• IV-SOV-6201</li> </ul> </li> </ul>
	BOP	Verify Emergency Diesel Generator status:

Op Test No.: 1 Scenario # All Event # Attachment 1 Page 25 of 29

Event Description: RO-1, BOP Operator Actions During EOPs

Time	Position	Applicant's Actions or Behavior
		<ul style="list-style-type: none"> <li>a. Check EDGs – ALL RUNNING</li> <li>b. Check Both EDG SWS Outlet Flow Control Valves – OPEN               <ul style="list-style-type: none"> <li>• SWN-FCV-1176</li> <li>• SWN-FCV-1176A</li> </ul> </li> <li>c. Dispatch NPO to set switches for both EDG SWS Outlet Flow Control Valves to OPEN:               <ul style="list-style-type: none"> <li>• SWN-FCV-1176</li> <li>• SWN-FCV-1176A</li> </ul> </li> </ul>
	BOP	<p>Verify Control Room Ventilation:</p> <ul style="list-style-type: none"> <li>a. SET Control Room ventilation control switch to – 10% INCIDENT MODE (switch position 3)</li> <li>b. Check Damper status Dampers A, B, F1, F2               <ul style="list-style-type: none"> <li>• A – DIM</li> <li>• B – BRIGHT</li> <li>• Either F1 OR F2 – BRIGHT</li> </ul> </li> <li>c. Verify AC Compressors and fans – ALL RUNNING               <ul style="list-style-type: none"> <li>• ACC 31A ON – BRIGHT</li> <li>• ACC 31B ON – BRIGHT</li> <li>• ACC 32A ON – BRIGHT</li> <li>• ACC 32B ON – BRIGHT</li> <li>• ACF 31 ON – BRIGHT</li> <li>• ACF 32 ON – BRIGHT</li> </ul> </li> </ul>

Op Test No.: 1 Scenario # All Event # Attachment 1 Page 26 of 29

Event Description: RO-1, BOP Operator Actions During EOPs

Time	Position	Applicant's Actions or Behavior
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	BOP	<p>Verify Emergency DC Oil Pumps status:</p> <ul style="list-style-type: none"> <li>• Main turbine emergency bearing oil pump – RUNNING</li> <li>• Dispatch NPO to verify main generator air side seal oil backup pump – RUNNING</li> <li>• MBFP DC emergency oil pump – RUNNING</li> </ul>
	BOP	<p>Reset SI as follows:</p> <ol style="list-style-type: none"> <li>Press BOTH SI RESET pushbuttons on Panel SBF-2: <ul style="list-style-type: none"> <li>• Train 1 SI Reset</li> <li>• Train 2 SI Reset</li> </ul> </li> <li>Check SI – RESET <ul style="list-style-type: none"> <li>• SI ACTUATED light – EXTINGUISHED</li> </ul> </li> </ol>
	BOP	<p>Reset MCCs as follows:</p> <ol style="list-style-type: none"> <li>Dispatch NPO to secure VC sump pumps and RCDT pumps on Waste Disposal panel</li> <li>Dispatch NPO to align and reset MCCs per SOP-EL-15</li> </ol>

**Note to examiner:**

The following step is designed to stop actions of RO-1 IF the CRS has transitioned to ES-1.1. The BOP will continue in RO-1 if there is transition to other procedures, but any time ES-1.1 is entered, the BOP will inform the CRS of automatic action verification and RO-1 will be suspended.

Op Test No.: 1 Scenario # All Event # Attachment 1 Page 27 of 29

Event Description: RO-1, BOP Operator Actions During EOPs

Time	Position	Applicant's Actions or Behavior
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	BOP	<p>Check if additional SI actions should be performed:</p> <ol style="list-style-type: none"> <li>Check if the CRS has transitioned to – ES-1.1</li> <li>Perform the following: <ul style="list-style-type: none"> <li>Inform the CRS of the status of automatic action verification</li> <li>If E-0 has been exited, THEN continue with step 17</li> <li>If E-0 has NOT been exited, then wait until E-0 is exited. When E-0 is exited, then recheck this step</li> </ul> </li> </ol>
	BOP	<p>Perform the following:</p> <ol style="list-style-type: none"> <li>Dispatch NPO to perform the following: <ul style="list-style-type: none"> <li>Close SWN-FCV-1111 and SWN-FCV-1112</li> </ul> </li> <li>Check Condensate Pumps – ONLY ONE RUNNING.</li> <li>SECURE all but one Condensate Pump</li> <li>Initiate the following section of SOP-EL-15 <ul style="list-style-type: none"> <li>Alignment of City water Cooling</li> </ul> </li> </ol>
	BOP	<p>Reset Containment isolation Phase A and Phase B as follows:</p> <ol style="list-style-type: none"> <li>PLACE switches for letdown orifice isolation valves to CLOSE: <ul style="list-style-type: none"> <li>200A</li> <li>200B</li> <li>200C</li> </ul> </li> <li>RESET Phase A</li> <li>RESET Phase B, if actuated</li> </ol>



Op Test No.: 1 Scenario # All Event # Attachment 1 Page 28 of 29

Event Description: RO-1, BOP Operator Actions During EOPs

Time	Position	Applicant's Actions or Behavior
	BOP	<p>Establish Instrument Air and Nitrogen to containment:</p> <ol style="list-style-type: none"> <li>Establish IA to containment: <ul style="list-style-type: none"> <li>Check INST AIR LOW PRESS alarm on panel SJF – CLEAR</li> <li>DEPRESS Inst Air reset pushbutton 28</li> <li>CHECK IA-PCV-1228, Inst Air to Cont. – OPEN</li> </ul> </li> <li>ESTABLISH PRZR PORV N2 supply: <ul style="list-style-type: none"> <li>PRESS Accumulator N2 Supply Reset pushbutton 44</li> <li>Check 863, Accumulator N2 Supply Valve – OPEN</li> </ul> </li> </ol>
	BOP	<p>Check if one non-essential Service Water pump should be started:</p> <ol style="list-style-type: none"> <li>Check Off-Site power to at least one Non-Essential service Water Pump – AVAILABLE</li> <li>Check SWN-FCV-1111 and SWN-FCV-1112 – CLOSED</li> <li>START one Non-Essential Service Water pump</li> </ol>
	BOP	<p>Check status of off-site power:</p> <ol style="list-style-type: none"> <li>VERIFY all AC Busses: <ul style="list-style-type: none"> <li>Energized by off-site power</li> <li>AND</li> <li>All 480V tie breakers open</li> </ul> </li> </ol>

Op Test No.: 1 Scenario # All Event # Attachment 1 Page 29 of 29

Event Description: RO-1, BOP Operator Actions During EOPs

Time	Position	Applicant's Actions or Behavior
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**NOTE**

It is permissible for operators to perform board clean-up actions (steps 22-29 of RO1, BOP OPERATOR ACTIONS DURING USE OF EOPs) while performing actions of other EOPs; provided this does not interfere with other EOPs in progress.

**EVALUATOR NOTE:** The remainder of the steps in this attachment are highlighted (High Level) action only.

	BOP	Re-align secondary plant
	BOP	Check secondary valve position
	BOP	Check Heater Drain Pumps 31 and 32 Tripped
	BOP	Check plant equipment status
	BOP	Determine if Source Range detectors should be energized
	BOP	Start AC Oil Pumps and Stop DC Oil pumps as follows
	BOP	Check Long Term Plant status
	BOP	Inform CRS that RO-1 is complete and advise on the status of actions